

NAVAL TECHNICAL TRAINING COMMAND

STUDENTS GUIDE

for

F14A LA-610 TACTICAL AIR RECONNAISSANCE POD SYSTEM (TAR)
ELECTRONICS MAINTENANCE SPECIALIST
ORGANIZATIONAL MAINTENANCE COURSE

C-102-3900

SECTION I (INFORMATION SHEETS)

SECTION IV (DIAGRAMS)



NOT AUTHORIZED FOR
USE IN MAINTENANCE
WORK CENTERS

CNTT N4409D (8-82)

NAVAL AIR MAINTENANCE TRAINING GROUP

For Training Purposes Only

NAVAL AIR MAINTENANCE TRAINING GROUP

STUDENT GUIDE

FOR

F14A LA-610 TACTICAL AIR RECONNAISSANCE POD. SYSTEM (TARPS)
ELECTRONICS MAINTENANCE SPECIALIST
ORGANIZATIONAL MAINTENANCE COURSE

C-102-3900

SECTION I (INFORMATION SHEETS)

SECTION IV (DIAGRAMS)

DATE: July 1982

(FOR TRAINING PURPOSES ONLY)

NAVAL AIR MAINTENANCE TRAINING GROUP

STUDENT GUIDE

FOR

F14A LA-610 TACTICAL AIR RECONNAISSANCE POD SYSTEM (TARPS)
ELECTRONICS MAINTENANCE SPECIALIST
ORGANIZATIONAL MAINTENANCE COURSE

C-102-3900

SECTION I (INFORMATION SHEETS)

DATE: July 1982

(FOR TRAINING PURPOSES ONLY)

TABLE OF CONTENTS

Table of Contents	i
Basic Photo Principals and Application to TARPS	1.1.4-IS-1
TARPS Power Distribution System	1.2.1-IS-1
TARPS Signal Distribution System	1.2.1-IS-2
TARPS Electrical System Interconnection Diagram	1.2.1-IS-3
IRPA ORM Sequence Chart	1.2.5-IS-1
AWG-9 Word "O" Input to CPS/CPS Response to AWG-9	1.2.8-IS-1
KS-87B Camera, Mount and Vacuum Pump Functional Check Procedures	2.1.1-IS-1
KA-99A Camera Functional Check Procedures	2.1.2-IS-1
Cryogenic System Check and Servicing Procedures	2.1.3-IS-1
AN/AAD-5 IRRS Functional Check Procedures	2.1.4-IS-1
DDS Functional Check Procedures	2.1.5-IS-1
CIPDU Functional Check Procedures	2.1.6-IS-1
CPS Functional Check Procedures	2.1.7-IS-1
ECS Functional Check Procedures	2.1.8-IS-1
Troubleshooting Faults in the TARPS System	2.2.3-IS-1

TITLE: LA-610A (TARPS) ELECTRONICS MAINTENANCE SPECIALIST
ORGANIZATIONAL MAINTENANCE COURSE C-102-3900

INFORMATION SHEET: 1.1.4-IS-1

SUBTITLE: BASIC PHOTO PRINCIPLES AND APPLICATION TO TARPS

. Lens

- a. Focal length is the distance from approximately the center of the lens to the film when imaging a distant object.
- b. f/number (F/number)
 - (1) A number representing approximately the ratio of focal length of the lens to the diameter of lens opening.
 - (2) Indicates speed of lens or how much light it passes. Comparable to a valve in a pipe which can open to various diameters and allow more or less water to flow
- c. f/stop
 - (1) Similar to f/number
 - (2) One f/stop larger (1 smaller number) allows exactly twice as much light to come in.
One f/stop smaller (1 larger number) allows half as much light to come in.
- d. Diaphragm
 - (1) Assembly in middle of lens which is opened or closed to allow more or less light to come through
 - (2) Diaphragm position determines f/number or f/stop
 - (3) Generally opened or closed by a motor and gear drive in response to exposure solution commands.

. Shutters

- a. In-between lens shutter
 - (1) Assembly of blades in center of lens, near diaphragm, used to control how long light is allowed to enter
 - (2) KS-87B originally equipped with in-between lens shutter; no longer installed
- b. Focal plane shutter (curtain type)
 - (1) Curtain with a variable width slit
 - (2) Width of slit and speed it is drawn across film determines its exposure time.
 - (3) Used in KS-87B camera
- c. Focal plane shutter (barrel type)
 - (1) Used in Pan camera
 - (2) Slit is located on circumference of barrel and is variable in width.
 - (3) Rotation of barrel during exposure produces same effect as curtain on KS-87B camera.

. Light sensors

- a. Photo cell which produces an electrical output proportional to intensity of light striking it.
- b. Light sensor(s) mounted on camera and see the same view as picture taking lens.
- c. Output of light sensor fed to Automatic Exposure Control (AEC) circuit.

4. Film speed
 - a. A number signifying the sensitivity of film to light
 - b. Used to determine correct exposure
 - c. Generally speaking, films that have the same sensitivity have the same film speed.
 - d. Film speed also known as Aerial Film Speed (AFS) and American Standards Association (ASA).

5. Filters
 - a. Solid glass or gelatin sandwiched between two glass layers used to obtain special results such as seeing better through haze.
 - b. Filter has color dye incorporated although it may seem colorless.
 - c. Filter is inserted in front of lens in TARPS cameras.
 - d. Filter always absorbs some amount of light. Therefore, exposure must be increased over that required without a filter
 - e. Filter factor (C)
 - (1) Specific number, i.e., 2, 3, etc. assigned to a specific filter
 - (2) Represents how many times exposure must be increased over that required without a filter.
 - f. Special case - a clear filter has no color and is used in aerial cameras to retain optical corrections.

6. S/C
 - a. Acronym used to denote quotient obtained by dividing film speed by filter factor
 - b. S represents film speed; C represents filter (or correction) factor
 - c. Setting made on KS-87B camera and KA-99A camera as inputs to determine correct exposure.

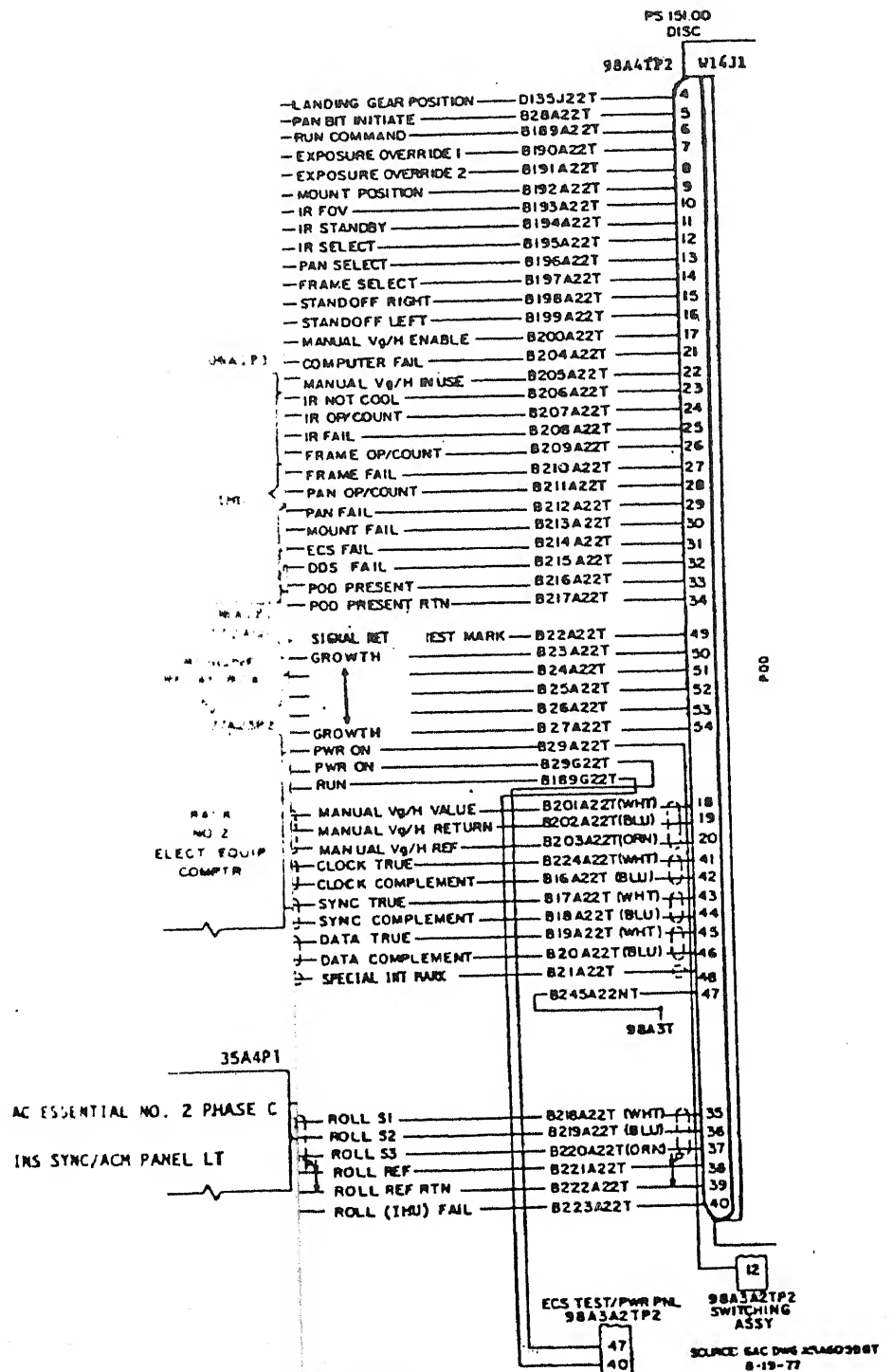
7. AEC
 - a. Acronym representing Automatic Exposure Control.
 - b. AEC circuitry incorporated in KS-87B and KA-99A cameras.
 - c. Solution of correct exposure by AEC uses as inputs:
 - (1) Light sensor(s)
 - (2) S/C setting
 - (3) Over or under exposure correction setting.

Forward Motion Compensation (FMC)
 Forward Motion Compensation (FMC) is a technique used in aerial cameras to compensate for the motion of the camera during exposure. As the camera moves forward, the image in the focal plane shifts. If the shutter is open for a long time, the image will be blurred. To avoid this, the shutter speed is increased as the camera moves forward. This is done by increasing the S/C setting. At high speeds, extremely fast shutter speeds are required. This is not a practical solution. In aerial cameras, film is moved during the exposure interval in the opposite direction of the camera's motion. This is done by moving the film forward at the appropriate speed to synchronize with the camera's motion. This thus cancels the effect of Forward Motion. In this way, Forward Motion Compensation is achieved by moving the film in the opposite direction of the camera's motion.

of the light spectrum that lies just beyond the visible spectrum of all heated bodies.

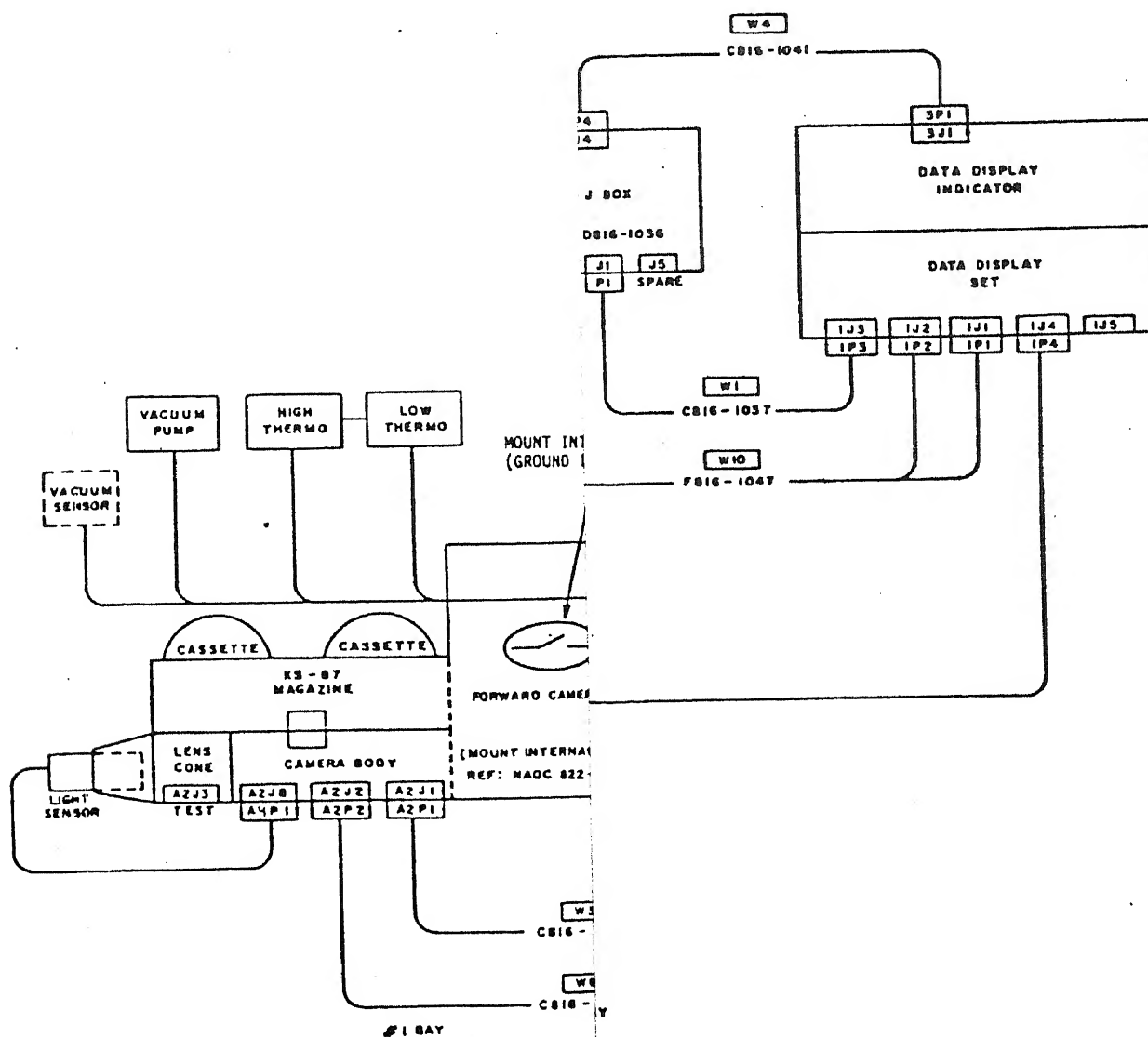
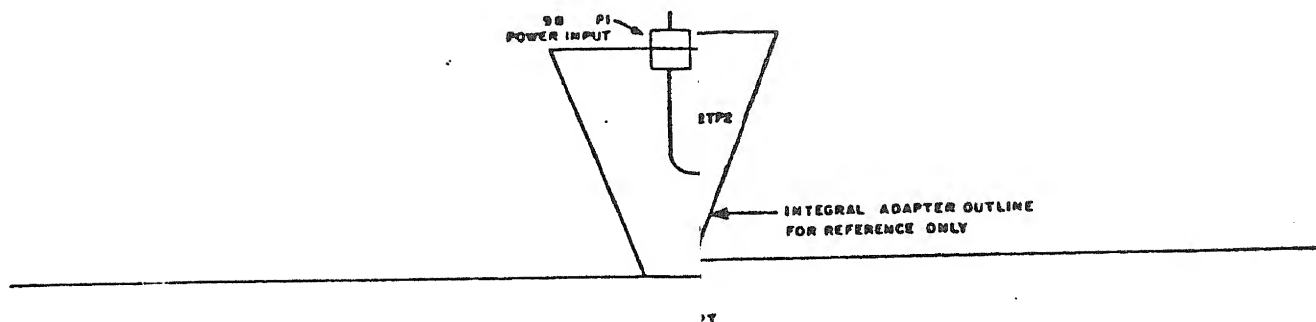
- b. Although invisible, behaves like visible light waves in that they travel in straight lines and can be brought to a focus and imaged on a focal plane.
 - c. Any windows or lenses that IR must pass through must be of special material such as quartz or germanium to reduce the amount of absorption of the rays by the window.
0. Degrees Kelvin (°K). A variation of the Centigrade temperature scale where 0°K is -273°C.
1. Data Block. Information inserted on each frame of the film such as aircraft altitude, attitude, ground position, etc. at the instant of exposure and used later in the interpretation of the photograph.
2. Fiducial Marks. Marks generated on edge(s) of each frame of film, or each foot of film in the case of the IRRS, used as a reference.
3. Special Interest Mark. A mark generated on the film in the case of the IRRS, or entry on the Special Interest section of the Data Block, which indicates that the specific frame is of special interest.
4. RHA. Acronym for Recording Head Assembly. A miniature cathode ray tube on which the Data Block is displayed. The Data Block image is transmitted by an optical system to the back of the film where it is recorded.
5. Cassette. Reloadable container attached to magazine which holds either the unexposed supply film or the exposed take-up film.
6. Frame. A term generally meaning one complete exposure of the film; similar to one snapshot on a roll of film. A frame is measured from either the center of one exposure to the center of next, or from leading edge of one exposure to leading edge of next.
7. Format. The exact dimensions (width and length) of the actual picture area. Does not include markers, data block, etc, which may lay outside the picture area.
8. Sensor.
- a. A term used to identify the optical or electronic devices used to gather information. In the case of TARPS, the sensors are the KS-87B and KA-99A cameras, and the AN/AAD-5 IRRS.
 - b. Sensor, as described here, should not be confused with light sensor as used in the AEC circuits.
9. Frame Camera. A term referring to the KS-87B type camera where the lens is fixed in the body.
20. Panoramic Camera. A term referring to the KA-99A type of camera where the lens system is rotated in some manner to sweep from horizon to horizon in each exposure.
21. IRRS. Acronym for Infrared Reconnaissance Set used to describe the AN/AAD-5 IR sensor. Also identified as IRLS, Infrared Line Scanner.

22. Vertical Photos. Photos taken directly below the aircraft. interpretation of this definition will be explained when the discussion is discussed.
23. Oblique Photos. Photos taken with the camera axis away from the vertical. A special interpretation of this definition applies to KA-99A.
 - a. Forward Oblique. Refers to pictures taken with the camera forward and away from the vertical.
 - b. Slide Oblique. Refers to pictures taken with the camera to the side and away from the vertical.
24. Overlap. The amount by which one photograph includes the same area covered by another; expressed as a percentage. 55% is the amount normally used in reconnaissance photography.
25. Nadir. A point on the ground directly below the aircraft.
26. Infinity. As it applies to photography, a distance far enough from the camera so that increasing the picture taking distance beyond that results in no changing of the camera focus.



SYSTEM

FORMATION SHEET NO. 1.2.1-IS-2



DIAGRAM

INFORMATION SHEET NO. 1.2.1-IS-3

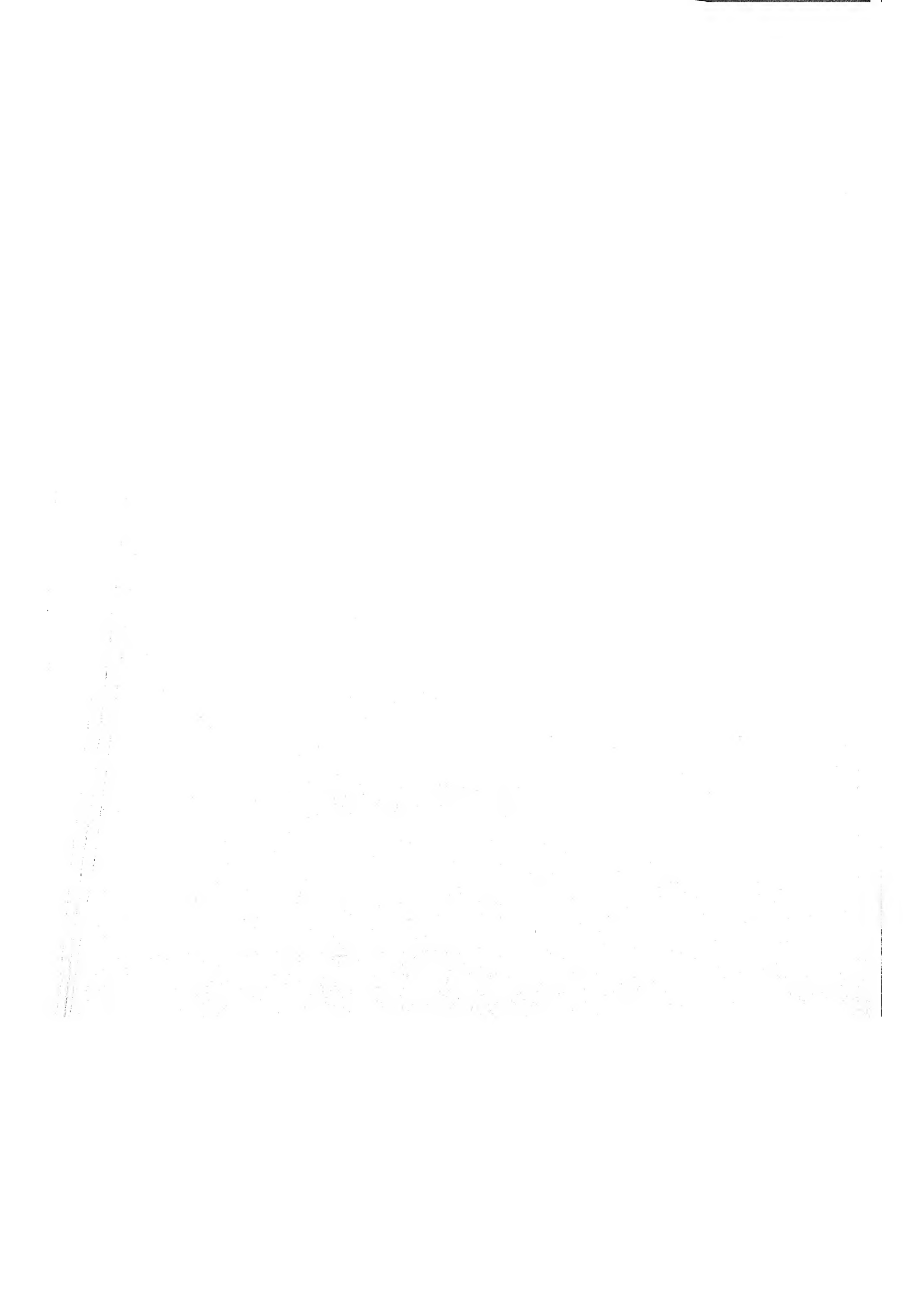
16 MARCH 81

PROGRAM ST (DECIMAL)	PROGRAM ST (OCTAL)	INITIAL DURATION	ORM DURATION	ORM TOTAL TIME	IRPA FUNCTION	COUNTER PRESET		SELECTED COUNT RATE	SELECTED APERTURE	SYSTEM CONTROL	FOV SELECTION	V/H SELECTION	VIDEO TEST ENABLE	ALLOWABLE RANGE	ALLOWABLE TOLERANCE	LRU
						DEC	OCT									
0	0	32s	488 μ s	488 μ s	Power on IRRS stabilization and IRPA self test	0	0	128 Hz	MSB	CP	CP	NAV	0	N/A	N/A	IRPA
1	1	1.024s	488 μ s	970 μ s	Cooldown allowance (17.0 min)	0	0	4 Hz	MSB	CP	CP	NAV	0	N/A	N/A	COOL
2	2		250 ms	250 ms	ECS circuits self test	0	0	400 Hz	4 Hz	CP	CP	NAV	0	1.5	\pm 50	IRPA
3	3		250 ms	500 ms	Video circuits self test	0	0	400 Hz	4 Hz	CP	CP	NAV	0	0.25	—	IRPA
4	4		24s	24.5s	Scanner speed stabilization (NFOV)	1024	2000	125 Hz	MSB		N			N/A	N/A	—
5	5		4s	28.5s	Sync pulse min prf (196 Hz)	3704	7170	TP 21	0.25 Hz		N			196	—	RCVR
6	6		4s	32.5s	Sync pulse max prf (203.5 Hz) QEP	3688	7150	TP 21	0.25 Hz		N		1	—	203.5	RCVR
7	7		2s	34.5s	ECS channels (NFOV)	0	0	N/A	0.50 Hz		N	9V		1.5	4.5	RCVR/ RCDR
10	8		16s	50.5s	Scanner speed stabilization (WFOV)	0	0	256 Hz	MSB		W	9V		N/A	N/A	—
11	9		4s	54.5s	Sync pulse min prf (392 Hz) QEP	3312	6350	TP 21	0.25 Hz		W	9V		392	—	RCVR
12	10		4s	58.5s	Sync pulse max prf (407 Hz) QEP	3280	6320	TP 21	0.25 Hz	1	W	9V		—	407	RCVR
13	11	N/A	2s	60.5s	ECS channels (WFOV)	0	0	N/A	0.50 Hz		W	9V		1.5	4.5	RCVR/ RCDR
14	12		2s	62.5s	Video channels (all channels on)	0	0	N/A	0.50 Hz		W	9V		0.25	—	RCDR
15	13	250ms	62.75s		Film trans. rf (16.22 kHz)	2054	4020	TP 56	4 Hz		W	9V		16.22	—	RCDR
16	14	250 ms	63.0s		Film trans. rf (16.89 kHz)	1976	3870	TP 56	4 Hz		W	9V		—	16.89	RCDR
17	15	2s	65.0s		V/H stabilization	0	0	N/A	0.50 Hz		W			N/A	N/A	—
20	16	2s	67.0s		Video channels (6 on, others off)	0	0	N/A	0.50 Hz		W			0.25	—	RCDR
21	17	4s	71.0s		Film trans. rf (min)	3504	6850	TP 56	0.25 Hz		W			297	—	RCDR
22	18	4s	75.0s		Film trans. rf (max)	3476	6624	TP 56	0.25 Hz		W			—	309	RCDR
23	19	5s	80.0s		Operate mode*, autofocus*, phase lock*, FMRFG*, and phosphor protect*	1536	3000	512 Hz	MSB		W			—	—	FMAG/ RCDR
24	20	0.5 ms	80.0s		End of sequence	0	0	N/A			CP	NAV	0	N/A	N/A	—

NOTES: All CMM functions are active during ORM sequences.

*Same tests performed when operate mode is selected manually.

NAV = Navigation computer
1 = IRPA
CP = Control Panel (CPS or CIPDU)
MSB = Most Significant Bit
ECS = Equalized Cold Spike
QEP = Quadrant Encoder Pulse



AWG-9 Word 0 Input to CPS
(Example with no FAILS indicated)

31	30	11	10	9	8	7	6	5	4	3	2	1
0			1	1	1	1	1	0	0	0	0	0
SPARES												

DATA FAIL

COMPUTER FAIL

Spare 1

Spare 2

BIT No.	CONDITION	BIT No.	CONDITION
1	RESET = 0 (1 never used)	9	<u>Spare 1</u> = 1
2-5	Word Number = All Zeros	10	<u>Spare 2</u> = 1
6	Tactical = 1	11-30	All Zeros
7	<u>CPS DATA FAIL</u> = 1	31	Odd Parity BIT
8	<u>COMPUTER FAIL</u> = 1		

TITLE: LA-610A (TARPS) ELECTRONICS MAINTENANCE SPECIALIST
ORGANIZATIONAL MAINTENANCE COURSE

INFORMATION SHEET NO. 2.1.1-IS-1

SUBTITLE: KS-87B CAMERA, MOUNT AND VACUUM PUMP FUNCTIONAL CHECK

1. Perform POWER ON procedures:

a. CPS:

- (1) SYSTEM Switch: OFF

CAUTION: Before applying aircraft power, observe all safety precautions for aircraft power turn on.

b. Power up aircraft:

- (1) Perform exterior safety check IAW NA-01F14AAA-2-1, WP 020-00.
- (2) Perform cockpit safety check IAW NA-01F14AAA-2-1, WP 021-00.
- (3) Apply external electrical power IAW NA-01F14AAA-2-1, WP 038-00.

c. Rear cockpit check:

- (1) Verify following circuit breakers (CBs) depressed:

- (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, RECON POD CONT.
- (b) 115VAC for pod: RECON POD PH A, PH B, and PH C (3-part CB).
- (c) 28VDC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs), RECON ECS CONT. AC.

- (2) CPS:

- (a) FRAME selector switch: OFF
- (b) PAN selector switch: OFF
- (c) IRLS selector switch: OFF
- (d) EXPOSURE selector switch: NORM
- (e) V/H selector switch: AUTO
- (f) FILM selector switch: OFF
- (g) SYSTEM switch: RDY

a. CIPDU Power check:

- (1) Open bay 4 port access door:
 - (a) Unfasten 14 quick release fasteners using correct tool.
 - (b) Lift door up.
 - (c) Secure positive door lock.
- (2) Verify AC power ON; POWER BUS A, B, and C indicators are illuminated.
- (3) Verify DC power ON; POWER BUS DC indicator illuminated.
- (4) Depress all circuit breakers not depressed: DDS (2), I PAN (2), MAINT PANEL (2), FRAME CAMERA (5), INFRARED (3). Observe PS1, PS3, PS4 indicators are illuminated. (PS2 indicator will not illuminate unless TEST/ACFT switch is in the TEST position and ACFT/SIMULT switch is in the SIMULT position).
- (5) If not already selected, press TEST/ACFT switch and select TEST; observe TEST bright.

e. CIPDU LAMP CHECK

- (1) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS just panel light intensity with DIMMER switch.
- (2) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS. Observe CIPDU panel lights bright except MARK, MASTER FAIL, lower half of OPER indicators. Replace burned out (080) bulbs. Depress MARK, MASTER FAIL, OPER indicators. Observe MARK, MASTER FAIL and lower half of OPER indicators bright. Replace burned out (080) bulbs.
- (3) Press LIGHTS/TEST/OFF. Select illuminate LIGHTS.
- (4) Depress bay 4 LH access door safety interlock switch. Verify CIPDU panel lights go out with the exception of MASTER FAIL (if on), POWER BUS A, B, C, DC and PS1 indicators. Release switch.
- (5) Set, verify OFF/READY selector switches for FRAME CAMERA, I ALT PAN CAMERA, INFRARED SENSOR in OFF position.
- (6) Depress RESET, if required. Observe red FAIL indicators return to green.

2. Perform DDS data insertion procedures.

- a. Open DDS access panel (Bay 4); if DDS BIT ball is red, depress to reset.

b. Set fixed data as follows:

(1) STATION 1: CYCLE - 50, FMC - 0709

(2) STATION 2: CYVLE - 18

3. KS-87B camera and mount functional check:

a. On FRAME CAMERA Module, depress OFF/READY selector

(1) READY should illuminate brightly

NOTE: If nose cone is open during functional check, mount will not respond to commands unless bay 1 interrupter switch is pulled out.

b. Observe FWD/VERT selector

(1) If VERT remains bright, verify that camera is in vertical position.

(2) If VERT goes out and FWD is dim:

(a) Depress FWD/VERT selector so that FWD goes out and VERT is dim.

(b) VERT should come on bright within 23 seconds.

(c) Verify that camera is in vertical position (Bay 1)

c. On AIRCRAFT SIMULATOR Module, depress ACFT/SIMULT selector

(1) SIMULT should illuminate brightly

d. Depress AUTO/MANUAL selector

(1) MANUAL should illuminate brightly

e. Depress .05/.1/.25/.5 selector until .1 value illuminates brightly.

f. On SENSOR TEST Module, depress and hold RUN switch for 10 seconds.

g. On FRAME CAMERA Module

(1) Observe that OPER indicator is on bright and lower half flashes at rate of 1 frame per two (2) seconds.

(2) Verify VACM FAIL indicator is green after 3 seconds have elapsed.

NOTE: This is the functional check for the Vacuum Pump.

h. On CPS (in rear cockpit), verify that counter for FRAME camera counts down 5 +1 frames.

1. On FRAME CAMERA Module, depress FWD/VERT selector
 - (1) VERT should go out and FWD will be dim.
 - (2) After 23 seconds, FWD should be bright and VERT dim.
 - (3) Verify that camera is in forward position (bay 1)
2. On AIRCRAFT SIMULATOR Module, depress .05/.1/.25/.5 selector. .5 illuminates brightly.
3. On SENSOR TEST Module, depress and hold RUN switch for 5 seconds.
4. On FRAME CAMERA Module, observe that OPER is on bright and half of indicator flashes at rate of one frame per second.
5. On CPS (in rear cockpit), verify that counter for FRAME can counts down 5 +1 frames.
6. On KS-87B camera (in bay 1), shine flashlight directly into sensor.
 - (1) Verify that shutter speed dial and lens diaphragm vary accordingly.
7. On FRAME CAMERA Module, depress FWD/VERT selector.
 - (1) FWD should go out and VERT will be dim.
 - (2) After 23 seconds, VERT should be bright and FWD dim.
 - (3) Verify that camera is in vertical position (bay 1)

5. POWER OFF procedures:

a. CIPDU switch positions:

- (1) Depress TEST/ACFT: illuminate ACFT brightly.
- (2) Depress ACFT/SIMULT; illuminate ACFT brightly
- (3) Depress OFF/READY selector switches for FRAME CAMERA, LOW ALT PAN CAMERA, and INFRARED SENSOR to illuminate OFF.
- (4) Depress LIGHTS/TEST/OFF; illuminate OFF brightly. Observe all other panel lights OFF with the exception of: MASTER FAIL (if on), Power Bus A, B, C and DC indicators and PSI indicator.

b. Close LH bay 4 access door

- (1) Disengage positive lock on port door.
- (2) Close door.
- (3) Fasten 14 quick release fasteners on door.

c. Rear Cockpit procedures

(1) CPS:

- (a) FRAME selector switch: OFF
- (b) PAN selector switch: OFF
- (c) IRLS selector switch: OFF
- (d) EXPOSURE selector switch: NORM
- (e) V/H selector switch: AUTO
- (f) FILM selector switch: OFF

NOTE: Wait 23 seconds before turning SYSTEM switch OFF to prevent mount or IR door remaining in halfway position.

(g) SYSTEM switch: OFF

(2) Verify following CBs pulled:

- (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, RECON POD CONT.
- (b) 115VAC for pod; RECON POD PH A, PH B, and PH C (3-part CB)

- (c) 28VDC for ECS: RECON ECS CONT DC.
- (d) 115VAC for ECS: RECON HTRS PH A, PH B, PH
RECON ECS CONT AC.
- d. Power "down" aircraft.

TITLE: LA-610A (TARPS) ELECTRONICS MAINTENANCE SPECIALIST ORGANIZATIONAL
MAINTENANCE COURSE

INFORMATION SHEET NO. 2.1.2-IS-1

SUBTITLE: KA-99A CAMERA FUNCTIONAL CHECK

1. Perform POWER ON procedures:

a. CPS:

- (1) SYSTEM switch: OFF

CAUTION: Before applying aircraft power, observe all safety precautions
for aircraft power turn on.

b. Power up aircraft

- (1) Perform exterior safety check IAW NA-01F14AAA-2-1, WP 020-00..
(2) Perform cockpit safety check IAW NA-01F14AAA-2-1, WP 021-00..
(3) Apply external electrical power IAW NA-01F14AAA-2-1, WP 038-00.

c. Rear cockpit check:

- (1) Verify following circuit breakers (CBs) depressed:

- (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, RECON
POD CONT.
(b) 115VAC for pod: RECON PH A, PH B, and PH C (3-part CB).
(c) 28VDC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs), RECON
ECS CONT. AC.

(2) CPS:

- (a) FRAME selector switch: OFF
(b) PAN selector switch: OFF
(c) IRLS selector switch: OFF
(d) EXPOSURE selector switch: NORM
(e) V/H selector switch: AUTO
(f) FILM selector switch: OFF
(g) SYSTEM switch: RDY

d. CIPDU Power check:

- (1) Open bay 4 port access door:
 - (a) Unfasten 14 quick release fasteners using correct tool.
 - (b) Lift door up.
 - (c) Secure positive door lock.
- (2) Verify AC power ON; POWER BUS A, B, and C indicators illuminated.
- (3) Verify DC power ON; POWER BUS DC indicator illuminated.
- (4) Depress all circuit breakers not depressed: DDS (2), PAN (2), MAINT PANEL (2), FRAME CAMERA (5), INTRARED (5). PS1, PS3, PS4 indicators are illuminated. (PS2 will not illuminate unless TEST/ACFT switch is in the TEST position and ACFT/SIMULT switch is in the SIMULT position)
- (5) If not already selected, press TEST/ACFT switch and select TEST. Observe TEST bright.

e. CIPDU LAMP CHECK

- (1) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS. Observe CIPDU panel light intensity with DIMMER switch.
- (2) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS. Observe CIPDU panel lights bright except MARK, MASTER FAIL, and lower half of OPER indicators. Replace burned out (080).
- (3) Press LIGHTS/TEST/OFF. Select illuminate LIGHTS.
- (4) Depress bay 4 LH access door safety interlock switch. Verify CIPDU panel lights go out with the exception of MASTER FAIL (if on), POWER BUS A, B, C, DC and PS1 indicators. Release door.
- (5) Set, verify OFF/READY selector switches for FRAME CAMERA, ALT PAN CAMERA, INFRARED SENSOR in OFF position.
- (6) Depress RESET, if required. Observe red FAIL indicators to green.

2. Perform DDS data insertion procedures:

- a. Open DDS access panel (Bay 4); if DDS BIT ball is red, depress reset.

b. Set fixed data as follows:

(1) STATION 3: Cycle - 37 FMC - 0503

(2) STATION 4: Cycle - 75 FMC - 0251

3. KA-99A camera functional check:

a. On Low ALT PAN CAMERA Module (CIPDU), depress OFF/READY switch.

(1) READY should illuminate brightly.

NOTE: PAN Camera operation disabled when bay 2 access door is open unless power interrupter switch has been pulled out.

b. Open bay 2 access door

(1) Ensure no fuses blown or FAIL indicators set on electronics unit.

CAUTION: If CAMR FAIL indicator is red, do not recycle camera or continue with test until first turning manual film transport knob on camera body. If lens barrel will not complete one revolution, further operation will result in film jam.

c. On SENSOR TEST Module, depress and hold RUN switch until camera operates for at least 2 frames.

d. On LOW ALT PAN CAMERA Module, depress OFF/READY switch.

(1) OFF should illuminate brightly.

e. On SENSOR TEST Module depress BITE INIT switch.

(1) Switch will illuminate brightly.

(2) After BIT cycle of 18 seconds (maximum), test is concluded.

f. Verify no fuses blown or FAIL indicators set on electronics unit.

g. Close bay 2 access door.

4. POWER OFF procedures:

a. CIPDU switch positions:

(1) Depress TEST/ACFT; illuminate ACFT brightly.

(2) Depress ACFT/SIMULT; illuminate ACFT brightly.

(3) Depress OFF/READY selector switches for FRAME CAMERA, LOW ALT PAN CAMERA, and INFRARED SENSOR to illuminate OFF.

- (4) Depress LIGHTS/TEST/OFF; illuminate OFF brightly. Observe other panel lights OFF with the exception of: MASTER (if on), Power Bus A, B, C and DC indicators and PSI in
- b. Close LH bay 4 access door
 - (1) Disengage positive lock on port door.
 - (2) Close door.
 - (3) Fasten 14 quick release fasteners on door.
- c. Rear cockpit procedures
 - (1) CPS:
 - (a) FRAME selector switch: OFF
 - (b) PAN selector switch: OFF
 - (c) IRLS selector switch: OFF
 - (d) EXPOSURE selector switch: NORM
 - (e) V/H selector switch: AUTO
 - (f) FILM selector switch: OFF

NOTE: Wait 23 seconds before turning SYSTEM switch OFF to prevent mou IR door remaining in halfway position.

- (g) SYSTEM switch: OFF
- (2) Verify following CBs pulled:
 - (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, RE POD CONT.
 - (b) 115VAC for pod: RECON POD PH A, PH B, and PH C (3-pa
 - (c) 28VDC for ECS: RECON ECS CONT DC.
 - (d) 115VAC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs), ECS CONT AC.
- d. Power "down" aircraft.

**TITLE: LA-610 (TARPS) ELECTRONICS MAINTENANCE SPECIALIST
ORGANIZATIONAL MAINTENANCE COURSE**

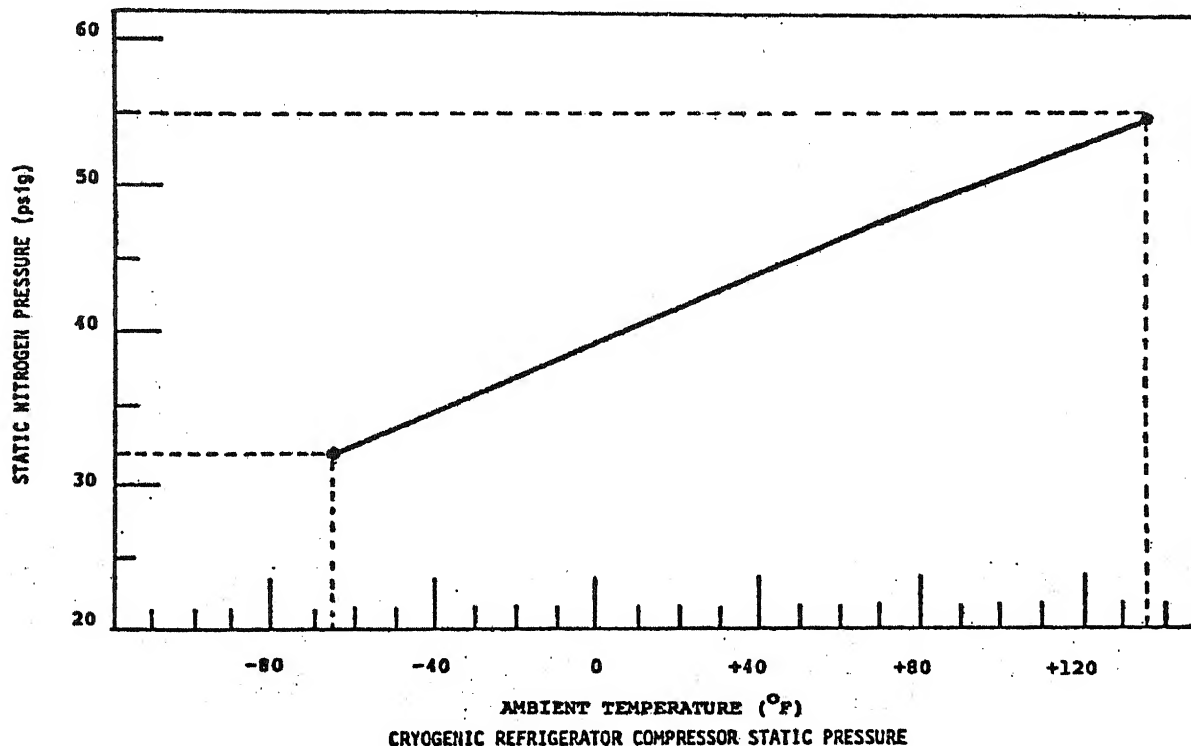
INFORMATION SHEET NO. 2.1.3-IS-f

SUBTITLE: CRYOGENIC SYSTEM CHECK AND SERVICING PROCEDURES

CAUTION: Insure that all nitrogen fittings are clean and free of all contaminants (grease, oil, and water) prior to servicing.

1. Check cryogenic refrigeration system:

- a. Inspect nitrogen pressure gauge. Using chart below, determine if static pressure charge is satisfactory. (Variation of +5 psig allowed from nominal value.)



- b. If pressure exceeds allowable value or 60 psig, bleed nitrogen system.
c. If pressure below allowable value, refill system.
d. If pressure below 10 psig, purge system.

CAUTION: When disconnecting nitrogen hoses, disconnect high pressure (yellow fitting) first. When connecting nitrogen hoses, connect low pressure (white fitting) first.

2. Bleed/fill cryogenic system:

- a. Check fittings and hoses for damage (170), loose (730), leak
- b. Verify fill and bleed valves on nitrogen servicing unit closed proceeding.
- c. Remove protective caps from servicing hose and nitrogen pressure gauge. Connect servicing hose to quick disconnect fitting on gauge.
- d. Open bleed valve slowly to reduce cryogenic system pressure; fill valve slowly to increase system pressure. Close valve when desired pressure obtained on pressure gauge.

3. Purge cryogenic system:

- a. Check for damaged (170), loose (730), leaking (381) fittings
- b. Verify fill and bleed valves on nitrogen servicing unit closed proceeding.
- c. Remove protective caps from servicing hose, nitrogen pressure gauge. Connect servicing hose to quick disconnect fitting on pressure gauge.
- d. Open fill valve slowly to increase system pressure to at least 10 psig.
- e. Close fill valve. Open bleed valve slowly; reduce pressure to 0 and 1 psig.
- f. Close bleed valve. Open fill valve slowly until pressure rises to 10 psig.
- g. Repeat steps e. and f. two additional times.
- h. Bring pressure down to nominal value by opening bleed valve on the nitrogen servicing unit. Static pressure charge should be recorded on chart. Disconnect servicing hose; replace protective caps on disconnect fittings.

TITLE: LA-610A (TARPS) ELECTRONICS MAINTENANCE SPECIALIST ORGANIZATIONAL
MAINTENANCE COURSE

INFORMATION SHEET NO. 2.1.4-IS-1

SUBTITLE: IRRS FUNCTIONAL CHECK

1. Perform POWER ON procedures:

a. CPS:

- (1) SYSTEM Switch: OFF

CAUTION: Before applying aircraft power, observe all safety precautions
for aircraft power turn on.

b. Power up aircraft

- (1) Perform exterior safety check IAW NA-01F14AAA-2-1, WP 020-00.
- (2) Perform cockpit safety check IAW NA-01F14AAA-2-1, WP 021-00.
- (3) Apply external electrical power IAW NA-01F14AAA-2-1, WP 038-00.

c. Rear cockpit check:

- (1) Verify following circuit breakers (CBs) depressed:

- (a) 28VDC for pod (3 CBs): RECON POD NO. 1, NO. 2, RECON
POD CONT.
- (b) 115VAC for pod: RECON POD PH A, PH B, and PH C (3-part
CB).
- (c) 28VDC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs),
RECON ECS CONT. AC.

- (2) CPS:

- (a) FRAME selector switch: OFF
- (b) PAN selector switch: OFF
- (c) IRLS selector switch: OFF
- (d) EXPOSURE selector switch: NORM
- (e) V/H selector switch: AUTO
- (f) FILM selector switch: OFF
- (g) SYSTEM switch: RDY

d. CIPDU Power check:

- (1) Open bay 4 port access door:
 - (a) Unfasten 14 quick release fasteners using correct tool.
 - (b) Lift door up.
 - (c) Secure positive door lock.
- (2) Verify AC power ON; POWER BUS A, B, and C indicators on CIPDU illuminated.
- (3) Verify DC power ON; POWER BUS DC indicator illuminated.
- (4) Depress all circuit breakers not depressed: DDS (2), LOW ALT PAN (2), MAINT PANEL (2), FRAME CAMERA (5), INFRARED (3). Observe PS1, PS3, PS4 indicators are illuminated. (PS2 indicator will not illuminate unless TEST/ACFT switch is in the TEST position and ACFT/SIMULT switch is in the SIMULT position).
- (5) If not already selected, press TEST/ACFT switch and select observe TEST bright.

e. CIPDU LAMP CHECK

- (1) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS. Adjust panel light intensity with DIMMER switch.
- (2) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS/TEST. Observe CIPDU panel lights bright except MARK, MASTER FAIL, and lower half of OPER indicators. Replace burned out (080) bulbs. Depress MARK, MASTER FAIL, OPER indicators. Observe MARK, MASTER FAIL and lower half of OPER indicators bright. Replace burned out (080) bulbs.
- (3) Press LIGHTS/TEST/OFF. Select illuminate LIGHTS.
- (4) Depress bay 4 LH access door safety interlock switch. Verify CIPDU panel lights go out with the exception of MASTER FAIL (if on), POWER BUS A, B, C, DC and PS1 indicators. Release switch.
- (5) Set, verify OFF/READY selector switches for FRAME CAMERA, LOW ALT PAN CAMERA, INFRARED SENSOR in OFF position.
- (6) Depress RESET, if required. Observe red FAIL indicators return to green.

2. Perform DDS data insertion procedures.

- a. Open D S access panel (Bay 4); if DDS BIT ball is red, depress to reset.
- b. Set fixed data as follows:
 - (a) STATION 3: FMC - 0503.

3. AN/AAD-5 IRRS functional check:

a. IR door check

NOTE: IR door operation disabled when bay 3 access door is open unless power interrupter switch has been pulled out.

WARNING : Ensure that personnel are clear of door before opening or closing.

- (1) On INFRARED SENSOR Module, depress DOOR OVERRIDE selector.
 - (a) DOOR on COOL/DOOR indicator should illuminate dimly, and then brightly when door is fully open.
 - (b) Verify that IR door is open within 23 seconds.
- (2) Depress DOOR OVERRIDE selector again.
 - (a) DOOR on COOL/DOOR indicator should illuminate dimly, and then go off when door is closed.
 - (b) Verify that IR door is closed within 23 seconds.

b. Sensor check

- (1) On INFRARED SENSOR Module, depress OFF/READY selector.
 - (a) OFF, READY, COOL and DOOR should be illuminated dimly.
 - (b) IR door should be closed. (Bay 3)
 - (c) Either WIDE or NARROW will be illuminated brightly, depending on position system was left in last.
- (2) Allow system cooldown
 - (a) COOL indicator should come on brightly after 32 seconds.
 - (b) When cooldown occurs (maximum time 17.6 minutes), READY and DOOR indicators come on brightly.
 - (c) Verify that IR door is open.

(3) Sensor self-test

- (a) Begins 25 seconds after cooldown.
- (b) READY on OFF/READY selector will illuminate dimly brightly after about 80 seconds.
- (4) Manually change field of view, listening for speed change mirror drive motor.

WARNING : If access to spin mirror aperture is required, turn first.

(5) Open Bay 3 access door.

- (a) Verify that no RCDR or RCVR FAIL indicators have been set on IRPA as a result of degraded operation.
- (b) Close Bay 3 access door.
- (6) On INFRARED SENSOR Module, depress OFF/READY selector.
 - (a) OFF should illuminate brightly.
 - (b) Verify that IR door is closed.
 - (c) COOL/DOOR indicator should illuminate dimly.

4. Perform POWER OFF procedures.

5. POWER OFF procedures:

a. CIPDU switch positions

- (1) Depress TEST/ACFT; illuminate ACFT brightly.
- (2) Depress ACFT/SIMULT; illuminate ACFT brightly.
- (3) Depress OFF/READY selector switches for FRAME CAMERA, LOW PAN CAMERA, and INFRARED SENSOR to illuminate OFF.
- (4) Depress LIGHTS/TEST OFF; illuminate OFF brightly. Observe other panel lights OFF with the exception of: MASTER FAIL (if on), Power BUS A, B, C and DC indicators and PSI indicator.

b. Close LH bay 4 access door

- (1) Disengage positive lock on port door.
- (2) Close door.
- (3) Fasten 14 quick release fasteners on door.

c. Rear cockpit procedures

(1) CPS:

- (a) FRAME selector switch: OFF
- (b) PAN selector switch: OFF
- (c) IRLS selector switch: OFF
- (d) EXPOSURE selector switch: NORM
- (e) V/H selector switch: AUTO
- (f) FILM selector switch: OFF

NOTE: Wait 23 seconds before turning SYSTEM switch OFF to prevent mount or IR door remaining in halfway position.

- (g) SYSTEM switch: OFF

(2) Verify following CBs pulled:

- (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, RECON POD CONT.
- (b) 115VAC for pod: RECON POI CB).
- (c) 28VDC for ECS: RECON
- (d) 115VAC for ECS: RECON
RECON ECS CONT AC.

d. Power "down" aircraft.

TITLE: LA-610A (TARPS) ELECTRONICS MAINTENANCE SPECIALIST ORGANIZATIONAL
MAINTENANCE COURSE

INFORMATION SHEET NO. 2.1.5-IS-1

SUBTITLE: DDS FUNCTIONAL CHECK

1. Perform POWER ON procedures:

a. CPS:

(a) SYSTEM Switch: OFF

CAUTION: Before applying aircraft power, observe all safety precautions
for aircraft power turn on.

b. Power up aircraft

(1) Perform exterior safety check IAW NA-01F14AAA-2-1, WP 020-00.

(2) Perform cockpit safety check IAW NA-01F14AAA-2-1, WP 021-00.

(3) Apply external electrical power IAW NA-01F14AAA-2-1, WP 038-00.

c. Rear cockpit check:

(1) Verify following circuit breakers

(a) 28VDC for pod (3 CBs)
POD CONT.

(b) 115VAC for pod: RECO
CB).

(c) 28VDC for ECS: RECO
ECS CONT. AC.

(2) CPS:

(a) FRAME selector switch

(b) PAN selector switch:

(c) IRLS selector switch:

(d) EXPOSURE selector sw:

(e) V/H selector switch:

(f) FILM selector switch

(g) SYSTEM switch: RDY

d. CIPDU Power check:

- (1) Open bay 4 port access door:
 - (a) Unfasten 14 quick release fasteners using correct
 - (b) Lift door up.
 - (c) Secure positive door lock.
- (2) Verify AC power ON; POWER BUS A, B, and C indicators illuminated.
- (3) Verify DC power ON; POWER BUS DC indicator illuminated
- (4) Depress all circuit breakers not depressed: DDS (2), PAN (2), MAINT PANEL (2), FRAME CAMERA (5), INFRARED (5). PS1, PS3, PS4 indicators are illuminated. (PS2 indicator will not illuminate unless TEST/ACFT switch is in TEST position and ACFT/SIMULT switch is in the SIMULT position)
- (5) If not already selected, press TEST/ACFT switch and select TEST. Observe TEST bright.

e. CIPDU LAMP CHECK

- (1) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS. Adjust panel light intensity with DIMMER switch.
- (2) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS. Observe CIPDU panel lights bright except MARK, MASTER FAIL and lower half of OPER indicators. Replace burned out bulbs. Depress MARK, MASTER FAIL, OPER indicators. Observe MARK, MASTER FAIL and lower half of OPER indicators bright. Replace burned out (080) bulbs.
- (3) Press LIGHTS/TEST/OFF. Select illuminate LIGHTS.
- (4) Depress bay 4 LH access door safety interlock switch. CIPDU panel lights go out with the exception of MASTER FAIL (if on), POWER BUS A, B, C, DC and PS1 indicators. Release switch.
- (5) Set, verify OFF/READY selector switches for FRAME CAMERA, ALT PAN CAMERA, INFRARED SENSOR in OFF position.
- (6) Depress RESET, if required. Observe red FAIL indicators turn to green.

2. DDS data insertion and verification

a. Note the following before proceeding.

- (1) Except for CYCLE and FMC, all switches and settings are set per instructions of the operational unit.

- (2) EXP and PW settings are suggested settings to be modified by local film processing experience.
 - (3) For test purposes in troubleshooting, fixed data such as DATE, MISSION LTR, SQUADRON, DET, CLASS CODE, CLASS DN-GR, and SORTIE can be set to any digits.
- b. Open DDS access panel (Bay 4); if DDS BIT ball is red, depress to reset.
- c. Set fixed data as follows:
- (1) STATION 1: CYCLE - 50, FMC - 0709, EXP - 3.
 - (2) STATION 2: CYCLE - 18, FMC - 0000, EXP - 0.
 - (3) STATION 3: CYCLE - 37, FMC - 0503, EXP - 0.
 - (4) STATION 4: CYCLE - 75, FMC - 0251, EXP - 3
 - (5) 99 PW Switch - 15
 - (6) MODE switches for STATIONS 1 and 4 and for KA-99 (As required).
 - (7) DATE, MISSION LTR, SQUADRON, DET, CLASS CODE, CLASS DN-GR, and SORTIE (As required).
 - (8) TIME CODE - set to L, Z, or T (As required).
 - (9) N-BLK and E-BLK switches (As required).
- d. Verify fixed data as follows:
- (1) Set TDU EXP to 3.
 - (2) Set TDU MODE switch to A/N.
 - (3) Adjust display brightness with DIM knob on DDI, as required.
 - (4) Observe that the following characters are displayed on the DDI as they have been set on the DDS: DATE, MISSION LTR, SORTIE, CLASS CODE, CLASS DN-GR, N-BLK and E-BLK.
 - (5) Set TDU MODE switch to BCD.
 - (6) Observe that the following characters are displayed on the DDI as they have been set on the DDS: DET and SQUADRON.
- e. Insert and verify time as follows:
- (1) Check time display on DDI.

- (a) Top line of A/N code matrix block.
- (b) TIME CODE letter, hour in 2 digits, minutes in 2 digits, seconds in 3 digits.
- (c) If time display not correct, insert time.

(2) Insert time date, if needed.

- (a) Set TDU MODE switch to A/N.
- (b) Set TIME PRESET switches on DDS one minute ahead of rect time.
- (c) When correct time is same as preset time, depress TIME button on DDS.
- (d) Check time display on DDI and reset if necessary.

3. AIRCRAFT SIMULATOR Module functional check:

- a. Depress ACFT/SIMULT selector on CIPDU - SIMULT should come on and PS2 indicator should illuminate on CIPDU.
- b. Depress AUTO/MANUAL selector - AUTO should come on bright.
- c. At bottom right of DDS, set TDU MODE switch to A/N.
- d. On AIRCRAFT SIMULATOR, run DATA thumbwheels from 0000 to 1111. Check to see if DDI shows same number.

, run AGL thumbwheels from 0000 to 1111. Check to see if DDI shows same numbers. (ion is fixed at 0.)

itch to BCD.

run Vg/H thumbwheels from 0.000 to 0.111. Then set to 1.000. Check to see if DDI

1.555. Check to see that DDI displays

ector again - MANUAL should come on bright

lector 4 times, observing DDI to see if Vg/H block.

ctor on CIPDU - AUTO should come on bright

- b. On AIRCRAFT SIMULATOR, set Vg/H thumbwheels to 0.500.
- c. Ensure all three (3) sensors' OFF/READY selectors are OFF.
- d. Depress and hold RUN selector on SENSOR TEST Module for 30 seconds. Verify BIT ball remains white. (This performs BIT on DDS.)
- e. On DDS, depress TDU EXP switch to 0. This turns off DDI.

5.

- a. AUTO Vg/H check
 - (1) On SENSOR TEST Module (CIPDU), depress TEST/ACFT switch and select TEST; observe TEST indicator illuminated.
 - (2) On AIRCRAFT SIMULATOR module (CIPDU), depress ACFT/SIMULT switch and select SIMULT; observe SIMULT indicator illuminated.
 - (3) Depress AUTO/MANUAL switch and select AUTO; observe AUTO indicator illuminated.
 - (4) Set Vg/H thumbwheels to 0.001.
 - (5) On CPS, put V/H switch in A
tor is OFF.
 - (6) On AIRCRAFT SIMULATOR module
0.000.
 - (7) On CPS, observe MAN V/H in
 - (8) On AIRCRAFT SIMULATOR module
and select ACFT; observe
 - (9) On SENSOR TEST module (CIPDU)
select ACFT; observe ACFT

5. POWER OFF procedures:

a. CIPDU switch positions:

- (1) Depress TEST/ACFT: illuminate ACFT brightly.
- (2) Depress ACFT/SIMULT; illuminate ACFT brightly
- (3) Depress OFF/READY selector switches for FRAME CAMERA, PAN CAMERA, and INFRARED SENSOR to illuminate OFF.
- (4) Depress LIGHTS/TEST/OFF; illuminate OFF brightly. Observe other panel lights OFF with the exception of: MASTER F (if on), Power Bus A, B, C and DC indicators and PSI in

b. Close LH bay 4 access door

- (1) Disengage positive lock on port door.
- (2) Close door.
- (3) Fasten 14 quick release fasteners on door.

c. Rear Cockpit procedures

(1) CPS:

- (a) FRAME selector switch: OFF
- (b) PAN selector switch: OFF
- (c) IRLS selector switch: OFF
- (d) EXPOSURE selector switch: NORM
- (e) V/H selector switch: AUTO
- (f) FILM selector switch: OFF

NOTE: Wait 23 seconds before turning SYSTEM switch OFF to prevent mou IR door remaining in halfway position.

(g) SYSTEM switch: OFF

(2) Verify following CBs pulled:

- (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, RECON POD CONT.
- (b) 115VAC for pod; RECON POD PH A, PH B, and PH C (3-pole CB)

(c) 28VDC for ECS: RECON ECS CONT DC.

(d) 115VAC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs),
RECON ECS CONT AC.

d. Power "down" aircraft.

TITLE: LA-610A (TARPS) ELECTRONICS MAINTENANCE SPECIALIST
ORGANIZATIONAL MAINTENANCE COURSE

INFORMATION SHEET NO. 2.1.6-IS-1

SUBTITLE: CIPDU FUNCTIONAL CHECK

1. Perform POWER ON procedures:

a. CPS:

- (1) SYSTEM Switch: OFF

CAUTION: Before applying aircraft power, observe all safety precautions for aircraft power turn on.

b. Power up aircraft:

- (1) Perform exterior safety check IAW NA-01F14AAA-2-1, WP 020-00.
- (2) Perform cockpit safety check IAW NA-01F14AAA-2-1, WP 021-00.
- (3) Apply external electrical power IAW NA-01F14AAA-2-1, WP 038-00.

c. Rear cockpit check:

- (1) Verify following circuit breakers (CBs) depressed:

- (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, RECON POD CONT.
- (b) 115VAC for pod: RECON POD PH A, PH B, and PH C (3-part CB).
- (c) 28VDC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs), RECON ECS CONT. AC.

- (2) CPS:

- (a) FRAME selector switch: OFF
- (b) PAN selector switch: OFF
- (c) IRLS selector switch: OFF
- (d) EXPOSURE selector switch: NORM
- (e) V/H selector switch: AUTO
- (f) FILM selector switch: OFF
- (g) SYSTEM switch: RDY

d. CIPDU Power check:

- (1) Open bay 4 port access door:
 - (a) Unfasten 14 quick release fasteners using correct t
 - (b) Lift door up.
 - (c) Secure positive door lock.
- (2) Verify AC power ON; POWER BUS A, B, and C indicators on illuminated.
- (3) Verify DC power ON; POWER BUS DC indicator illuminated.
- (4) Depress all circuit breakers not depressed: DDS (2), LOW PAN (2), MAINT PANEL (2), FRAME CAMERA (5), INFRARED (3). Observe PS1, PS3, PS4 indicators are illuminated. (PS2 : cator will not illuminate unless TEST/ACFT switch is in TEST position and ACFT/SIMULT switch is in the SIMULT pos
- (5) If not already selected, press TEST/ACFT switch and select TEST; observe TEST bright.

e. CIPDU LAMP CHECK

- (1) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS. Just panel light intensity with DIMMER switch.
- (2) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS/ Observe CIPDU panel lights bright except MARK, MASTER FAIL lower half of OPER indicators. Replace burned out (080) 1 Depress MARK, MASTER FAIL, OPER indicators. Observe MARK, MASTER FAIL and lower half of OPER indicators bright. Replace burned out (080) bulbs.
- (3) Press LIGHTS/TEST/OFF. Select illuminate LIGHTS.
- (4) Depress bay 4 LH access door safety interlock switch. Verify CIPDU panel lights go out with the exception of MASTER FAIL (if on), POWER BUS A, B, C, DC and PS1 indicators. Release switch.
- (5) Set, verify OFF/READY selector switches for FRAME CAMERA, ALT PAN CAMERA, INFRARED SENSOR in OFF position.
- (6) Depress RESET, if required. Observe red FAIL indicators return to green.

2. Perform DDS data insertion procedures.

- a. Open DDS access panel (Bay 4); if DDS BIT ball is red, depress t reset.

b. Set fixed data as follows:

- (1) STATION 1: CYCLE - 50, FMC - 0709
- (2) STATION 2: CYCLE - 18, FMC - 0000
- (3) STATION 3: CYCLE - 37, FMC - 0503
- (4) STATION 4: CYCLE - 75, FMC - 0251

3. CIPDU Functional Check:

- a. Verify CIPDU indicator is green; if indicator is red, depress to reset.
- b. Perform functional checks: (NOTE: These checks are covered in detail in other lesson topics.)
 - (1) AIRCRAFT SIMULATOR Module functional check
 - (2) KS-87B functional check with the following exceptions:
 - (a) Only CYCLE and FMC fixed data are set into the DDS to provide correct Sensor Control output.
 - (b) Disregard lens diaphragm and shutter speed test.
 - (3) KA-99A BIT check with the following exceptions:
 - (a) Only CYCLE and FMC fixed data are set into the DDS to provide correct Sensor Control Output.
 - (4) IRRS BIT check with the following exceptions:
 - (a) Only FMC fixed data is set into the DDS to provide correct Sensor Control output.

4. POWER OFF procedures:

a. CIPDU switch positions:

- (1) Depress TEST/ACFT: illuminate ACFT brightly.
- (2) Depress ACFT/SIMULT; illuminate ACFT brightly
- (3) Depress OFF/READY selector switches for FRAME CAMERA, PAN CAMERA, and INFRARED SENSOR to illuminate OFF.
- (4) Depress LIGHTS/TEST/OFF; illuminate OFF brightly. Ob other panel lights OFF with the exception of: MASTER (if on), Power Bus A, B, C and DC indicators and PSI

b. Close LH bay 4 access door

- (1) Disengage positive lock on port door.
- (2) Close door.
- (3) Fasten 14 quick release fasteners on door.

c. Rear Cockpit procedures

(1) CPS:

- (a) FRAME selector switch: OFF
- (b) PAN selector switch: OFF
- (c) IRLS selector switch: OFF
- (d) EXPOSURE selector switch: NORM
- (e) V/H selector switch: AUTO
- (f) FILM selector switch: OFF

NOTE: Wait 23 seconds before turning SYSTEM switch OFF to prevent m IR door remaining in halfway position.

- (g) SYSTEM switch: OFF

(2) Verify following CBs pulled:

- (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, POD CONT.
- (b) 115VAC for pod; RECON POD PH A, PH B, and PH C (3-CB)

(c) 28VDC for ECS: RECON ECS CONT DC.

(d) 115VAC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs),
RECON ECS CONT AC.

d. Power "down" aircraft.

TITLE: LA-610A (TARPS) ELECTRONICS MAINTENANCE SPECIALIST
ORGANIZATIONAL MAINTENANCE COURSE

INFORMATION SHEET NO. 2.1.7-IS-1

SUBTITLE: CPS FUNCTIONAL CHECK

1. Perform POWER ON procedures:

a. CPS:

- (1) SYSTEM Switch: OFF

CAUTION: Before applying aircraft power, observe all safety precautions for aircraft power turn on.

b. Power up aircraft:

- (1) Perform exterior safety check IAW NA-01F14AAA-2-1, WP 020-00.
- (2) Perform cockpit safety check IAW NA-01F14AAA-2-1, WP 021-00.
- (3) Apply external electrical power IAW NA-01F14AAA-2-1, WP 038-00.

c. Rear cockpit check:

- (1) Verify following circuit breakers (CBs) depressed:

- (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, RECON POD CONT.
- (b) 115VAC for pod: RECON POD PH A, PH B, and PH C (3-part CB).
- (c) 28VDC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs), RECON ECS CONT. AC.

- (2) CPS:

- (a) FRAME selector switch: OFF
- (b) PAN selector switch: OFF
- (c) IRLS selector switch: OFF
- (d) EXPOSURE selector switch: NORM
- (e) V/H selector switch: AUTO
- (f) FILM selector switch: OFF
- (g) SYSTEM switch: RDY

d. CIPDU Power check:

- (1) Open bay 4 port access door:
 - (a) Unfasten 14 quick release fasteners using correct tool.
 - (b) Lift door up.
 - (c) Secure positive door lock.
- (2) Verify AC power ON; POWER BUS A, B, and C indicators on CIPDU illuminated.
- (3) Verify DC power ON; POWER BUS DC indicator illuminated.
- (4) Depress all circuit breakers not depressed: DDS (2), LOW PAN (2), MAINT PANEL (2), FRAME CAMERA (5), INFRARED (3). Observe PS1, PS3, PS4 indicators are illuminated. (PS2 indicator will not illuminate unless TEST/ACFT switch is in the TEST position and ACFT/SIMULT switch is in the SIMULT position).
- (5) If not already selected, press TEST/ACFT switch and select TEST; observe TEST bright.

e. CIPDU LAMP CHECK

- (1) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS. Adjust panel light intensity with DIMMER switch.
- (2) Press LIGHTS/TEST/OFF switch. Select, illuminate LIGHTS/TEST. Observe CIPDU panel lights bright except MARK, MASTER FAIL. Observe lower half of OPER indicators. Replace burned out (080) bulbs. Depress MARK, MASTER FAIL, OPER indicators. Observe MARK, MASTER FAIL and lower half of OPER indicators bright. Replace burned out (080) bulbs.
- (3) Press LIGHTS/TEST/OFF. Select illuminate LIGHTS.
- (4) Depress bay 4 LH access door safety interlock switch. Verify CIPDU panel lights go out with the exception of MASTER FAIL (if on), POWER BUS A, B, C, DC and PS1 indicators. Release switch.
- (5) Set, verify OFF/READY selector switches for FRAME CAMERA, I ALT PAN CAMERA, INFRARED SENSOR in OFF position.
- (6) Depress RESET, if required. Observe red FAIL indicators return to green.

2. Perform DDS data insertion procedures.

- a. Open DDS access panel (Bay 4); if DDS BIT ball is red, depress the reset.

b. Set fixed data as follows:

- (1) STATION 1: CYCLE - 50, FMC - 0709
- (2) STATION 2: CYCLE - 18, FMC - 0000
- (3) STATION 3: CYCLE - 37, FMC - 0503
- (4) STATION 4: CYCLE - 75, FMC - 0251

3. CPS Functional Check

a. Manual Vg/H TEST

- (1) On CPS, set VEL KT X 10 thumbwheels to 90.
- (2) Set ALT FT X 100 thumbwheels to 005.
- (3) Depress and hold V/H switch in TEST position; observe MAN V/H indicator is off.
- (4) Set VEL KT X 10 thumbwheels to 20.
- (5) Set ALT FT X 100 thumbwheels to 010.
- (6) Depress and hold V/H switch; V/H indicator illuminate.
- (7) Put V/H switch in MAN position; V/H indicator illuminated.

b. KS-87B Check

- (1) On CPS, put Frame switch that KS-87B mount is in
- (2) Put FILM switch in RUN position; observe that FRAME counter counts
- (3) Put FRAME switch in FWD position; observe that FRAME counter counts
- (4) Set VEL KT X 10 thumbwheels to 90
- (5) Put FILM switch in RUN position; observe that FRAME counter counts
- (6) Put FRAME switch in OFF position; observe that FRAME counter counts

- d. KA-99A check
 - (1) Put PAN switch in BIT position; observe that PAN indicator flashes and that FRAMES counter counts down 5 times.
 - (2) Put PAN switch in CTR position.
 - (3) Set VEL KT X 10 thumbwheels to 66.
 - (4) Set ALT FT X 100 thumbwheels to 050.
 - (5) Put FILM switch in RUN position for 5 seconds, then return to OFF position; observe that PAN indicator flashes green and that FRAME counter counts down at one cycle/second.
 - (6) Put PAN switch in LEFT position.
 - (7) Set ALT FT X 100 thumbwheels to 025.
 - (8) Put FILM switch in RUN position for 5 seconds, then return to OFF position; observe that PAN indicator flashes green and that FRAME counter counts down at one cycle/second.
 - (9) Put PAN switch in RIGHT position.
 - (10) Put FILM switch in RUN position for 5 seconds, then return to OFF position; observe that PAN indicator flashes green and that FRAME counter counts down at one cycle/second.
 - (11) Put PAN switch in OFF position.
- e. IRRS check
 - (1) Put IRLS switch in STBY position; observe IRNR indicator illuminate during cooldown.
 - (2) Set VEL KT X 10 thumbwheels to 41.
 - (3) Set ALT FT X 100 thumbwheels to 005.
 - (4) When IRNR indicator goes off after cooldown, put IRLS switch in NFOV position.
 - (5) Put FILM switch in RUN position for 5 seconds, then return to OFF position; observe that IRLS indicator flashes green and that FEET counter counts down at $\frac{1}{2}$ cycle/second.
 - (6) Put IRLS switch in WFOV position.
 - (7) Put FILM switch in RUN position for 10 seconds, then return to OFF position; observe that IRLS indicator flashes green and that FEET counter counts down at $\frac{1}{2}$ cycle/second.
 - (8) Put IRLS switch in OFF position.
- f. MARK check
 - (1) Put FILM switch in MARK position, then return to OFF position; observe special interest MARK in data block on DDI of DDS (Bay 4).
- g. EXPOSURE Check
 - (1) On CPS, put FRAME switch in VERT position.
 - (2) On KS-87B camera, shine flashlight into light sensor until lens dial begins to move, then move flashlight until dial stabilizes at mid range. (Bay 1)
 - (3) On CPS, put EXPOSURE switch in OVER position, then UNDER position, then return to NORM position; on KS-87B lens diaphragm dial, observe dial moves toward f/2.8, then toward f/6.7, then returns to mid range.
- h. Lights check
 - (1) On TEST panel, put IND LT/DDI BIT switch in IND LT position; on CPS, observe all indicator lights illuminate.
- i. Perform Landing Gear Handle functional check:
 - (1) On POD,
 - (a) Close Bay 4LH access door or
 - (b) Pull Bay 4LH access door interlock switch out to place CIPDU in ACFT mode.
 - (2) On CPS, put FRAME switch in FWD position; in POD, observe that KS-87B mount is in the vertical position (Bay 1).
 - (3) In front Cockpit, put LDG GEAR handle in UP position; in POD, observe KS-87B mount is in the forward position (Bay 1).

- (4) Put LDG GEAR handle in DOWN position; in POD, observe KS-87B mount is in the verticle position (Bay 1).
- (5) On CPS, put FRAME switch in OFF position.
- (6) On POD
 - (a) Open Bay 4 LH access door or
 - (b) Push Bay 4 LH access door interlock switch in to the normal position to place CIPDU in TEST mode.

j. Pilots bomb switch check

- (1) On CPS, set VEL KT X IO thumbwheels to 010.
- (2) Put FRAME switch in VERT postion.
- (3) On Pilots hand grip, depress and hold bomb switch for 5 seconds, then release. on CPS, observe that FRAME indicator flashes green and that the counter counts down at one cyle/second.
- (4) On CPS, put FRAME switch in OFF position.

k. DATA fail indicator check

- (1) On TEST panel, put GRD CIG switch in OBC/CABIN position.
- (2) On LIQ COOLING panel, put LIQ COOLING switch in AWG-9 positon.
- (3) On hand control, put WCS switch in STBY position.

CAUTION: If C&D HOT, COOLING AIR, or AWG-9 COND. indicators illuminate WCS shall be shut down and test discontinued until problem is resolved.

NOTE: Setting WCS switch to STFY causes WCS to perform automatic sequence 2 check. MOR B will appear on the TID for approximately 10 seconds.

- (6) On hand control, put WCS switch in OFF position.
- (7) On LIQ COOLING panel, put LIQ COOLING switch in OFF position.
- (8) On TEST panel, put GRD CLG switch in OFF position.

4. POWER OFF procedures:

a. CIPDU switch positions:

- (1) Depress TEST/ACFT: illuminate ACFT brightly.
- (2) Depress ACFT/SIMULT; illuminate ACFT brightly
- (3) Depress OFF/READY selector switches for FRAME CAMERA, LC PAN CAMERA, and INFRARED SENSOR to illuminate OFF.
- (4) Depress LIGHTS/TEST/OFF; illuminate OFF brightly. Observe other panel lights OFF with the exception of: MASTER FA (if on), Power Bus A, B, C and DC indicators and PSI indicators.

b. Close LH bay 4 access door

- (1) Disengage positive lock on port door.
- (2) Close door.
- (3) Fasten 14 quick release fasteners on door.

c. Rear Cockpit procedures

(1) CPS:

- (a) FRAME selector switch: OFF
- (b) PAN selector switch: OFF
- (c) IRLS selector switch: OFF
- (d) EXPOSURE selector switch: NORM
- (e) V/H selector switch: AUTO
- (f) FILM selector switch: OFF

NOTE: Wait 23 seconds before turning SYSTEM switch OFF to prevent mount IR door remaining in halfway position.

(g) SYSTEM switch: OFF

(2) Verify following CBs pulled:

- (a) 28VDC for pod (3 CBs): RECON POD DC NO. 1, NO. 2, RECON POD CONT.
- (b) 115VAC for pod; RECON POD PH A, PH B, and PH C (3-part CB)

(c) 28VDC for ECS: RECON ECS CONT DC.

(d) 115VAC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs), RECON
ECS CONT AC.

d. Power "down" aircraft.

TITLE: LA-610 (TARPS) ELECTRONICS MAINTENANCE SPECIALIST
ORGANIZATIONAL MAINTENANCE COURSE C-102-3900

INFORMATION SHEET NO. 2.1.8-IS-1

SUBTITLE: ECS FUNCTIONAL CHECK PROCEDURES

1. Perform POWER ON procedures:

CAUTION: Before applying aircraft power, observe all mandatory safety precautions for aircraft power turn on. Refer to NAVAIR 01-F14AAA-6-3.

- a. Power up aircraft
- b. Rear cockpit check
 - (1) Verify following circuit breakers (CBs) depressed:
 - (a) 28VDC for ECS: RECON ECS CONT DC.
 - (b) 115VAC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs), ECS CONT AC.

2. Location of and access to ECS TEST/POWER Panel:
- a. TEST/POWER Panel is mounted in aft end, port side, of pod adapter (station 177.18).
 - b. Unfasten (15) fasteners attaching access door to pod adapter.
 - c. Open access door

3. ECS power check:
- a. Verify that the following AC-DC circuit breakers are depressed: COMPT (2) and WINDOW (2).
 - b. Verify that panel lighting is ON.
 - c. Verify that the following switches and indicators are OFF: POWER switch, POWER indicator, TEST selector switch, TEST indicator.
 - d. Press POWER indicator - light should illuminate brightly.
 - e. Turn POWER switch ON - POWER indicator light should come ON.
 - f. Press TEST indicator light - light should come ON brightly.

4. ECS BIT check:

NOTE: Compartment and Window Controller valve CLOSE tests must be conducted without delay after OPEN tests, since valves may drive toward CLOSE after completing OPEN tests.

- a. Selector switch in Position 2 (HEATER SYS - COMPT) - TEST indicator light should be OFF.
 - (1) Depress and hold TEST switch only long enough for TEST light to go ON.
 - (2) Release TEST switch immediately - TEST light should go OFF.
- b. Selector switch in Position 3 (HEATER SYS - WINDOW) - TEST indicator light should be OFF.

- (1) Depress and hold TEST switch only long enough for TEST light to go ON.
- (2) Release TEST switch immediately - TEST light should go OFF.
- c. Selector switch in Position 4 (COMPT MOD SYS - OPEN) - TEST indicator light should be OFF.
 - (1) Depress, then release TEST switch - TEST light should come ON within 170 seconds.
- d. Selector switch in Position 5 (COMPT MOD SYS - CLOSE) - TEST indicator light should be OFF.
 - (1) Depress, then release TEST switch - TEST light should come ON within 110 - 170 seconds.
- e. Selector switch in Position 6 (WINDOW MOD SYS - OPEN) - TEST indicator light should be OFF.
 - (1) Depress, then release TEST switch - TEST light should come ON within 170 seconds.
- f. Selector switch in Position 7 (WINDOW MOD SYS - CLOSE) - TEST indicator light should be OFF.
 - (1) Depress, then release TEST switch - TEST light should come ON within 110 - 170 seconds.
- g. Selector switch in Position 8 (WINDOW AIR SOV - OPEN) - TEST indicator light should be OFF.
 - (1) Depress and hold TEST switch until TEST light comes ON - should be less than one second.
 - (2) Release TEST switch - TEST light should go OFF.
- h. Selector switch in Position 9 (WINDOW AIR SOV - CLOSE) - TEST indicator light should be OFF.
 - (1) Depress and hold TEST switch until TEST light comes ON - should be less than one second.
 - (2) Release TEST switch - TEST light should go OFF.

5. Turn selector switch to OFF.

6. Turn POWER switch to OFF.

7. Close ECS TEST/POWER panel access door.

8. Perform POWER OFF procedures:

- a. Rear cockpit check
 - (1) Verify following CBs pulled:
 - (a) 28VDC for ECS: RECON ECS CONT DC.
 - (b) 115VAC for ECS: RECON HTRS PH A, PH B, PH C (3 CBs), RECON ECS CONT AC.
- b. Power "down" aircraft.

TITLE: LA-610 (TARPS) ELECTRONICS MAINTENANCE SPECIALIST ORGANIZATIONAL
MAINTENANCE COURSE

INFORMATION SHEET NO. 2.2.3-IS-1

SUBTITLE: TROUBLESHOOTING FAULTS IN THE TARPS SYSTEM

1. Perform POWER ON procedure, observing all safety precautions.
2. Using the correct functional check procedures as outlined in the TARPS Manuals and the MRC deck, troubleshoot all faults in the TARPS system, observing all safety precautions.
3. Perform POWER OFF procedures.

NAVAL AIR MAINTENANCE TRAINING

STUDENT GUIDE

FOR

F14A LA-610 TACTICAL AIR RECONNAISSANCE
ELECTRONICS MAINTENANCE &
ORGANIZATIONAL MAINTENANCE

C-102-3900

SECTION IV (DIAGRAMS)

TABLE OF CONTENTS

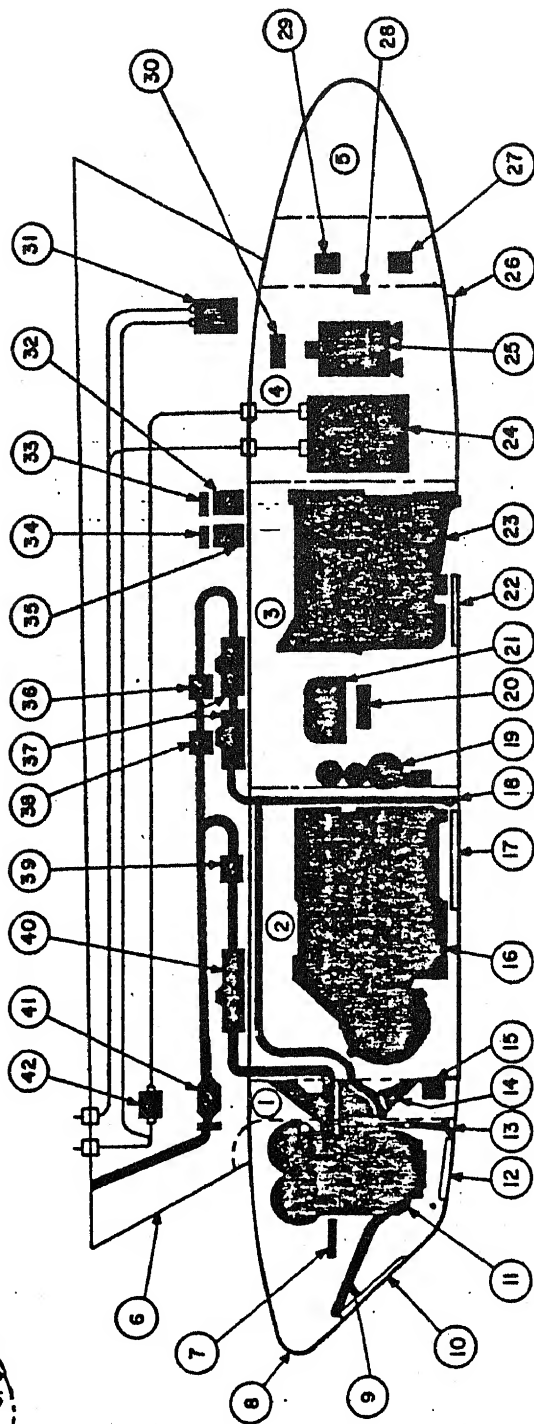
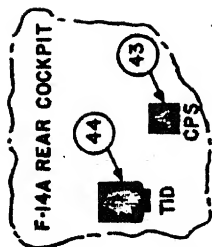
Table of Contents	i
<u>Learning Activity Guide and Student Activity Guide Topics:</u>	
TARPS COMPONENT LOCATIONS	1
CONTROLLER-PROCESSOR SIGNAL	2
TID DISPLAY	3
CONTROLLER INDICATOR POWER DISTRIBUTION UNIT	4
CIPDU FRAME COMPONENTS	5
CIPDU MODULES	6
DDS CONTROL PANEL	7
F-14A AFT COCKPIT CONSOLE CONFIGURATION	8
KS-87B FILM TRANSPORT MECHANISM	9
KS-87B CAMERA FILM LOADING	10
KS-87B CAMERA AUXILIARY DATA RECORDING SYSTEM, PICTORIAL DIAGRAM	11
AUTOMATIC EXPOSURE CONTROL SYSTEM, SIMPLIFIED FUNCTIONAL BLOCK DIAGRAM	12
CAMERA FIELD OF VIEW AT NADIR AND AT 30° BELOW HORIZON	13
AUTOCYCLE/PULSE MODE OPERATION	14
KA-99A CAMERA SYSTEM PULSE MODE OPERATION	15
KA-99A OPTICAL BARREL ASSEMBLY	16
KS-87B FAIL CIRCUITS (SIMPLIFIED SCHEMATIC DIAGRAM)	17
KA-99A FILM DRIVE SYSTEM	18
KA-99A FILM LOOP DETECTION SYSTEM	19
KA-99A FILM FORMAT*	20
KA-99A FAIL CIRCUITS	21

TABLE OF CONTENTS (CONT'D)

PREPARATION OF KA-99A FILM LEADER FOR LOADING	22
BCD CODE DEFINITIONS	23
BCD FORMAT	24
ALPHANUMERIC FORMAT	25
AUTOMATIC EXPOSURE CONTROL SYSTEM, SIMPLIFIED FUNCTIONAL BLOCK DIAGRAM	26
DDS CAMERA CONTROL OPERATIONAL MODES	27
AN/AAD-5 RECEIVER	28
AN/AAD-5 RECEIVER DETECTOR ARRAY	29
SIGNAL PROCESSING WAVEFORMS	30
IR RECEIVER MAINTENANCE PLATE ASSEMBLY	31
FMC FILM DRIVE SERVO LOOP BLOCK DIAGRAM	32
CPS AND CIPDU	33
CPS, IRPA, AND CIPDU FAIL INDICATORS	34
CRYOGENIC REFRIGERATOR COMPRESSOR STATIC PRESSURE COMPARISON OF KELVIN, CENTIGRADE, FAHRENHEIT SCALES	35
55% OVERLAP CYCLE RATE COMPARISON BETWEEN VERTICAL AND FORWARD PHOTOGRAPH	36
SENSOR TEST	37
FRAME CAMERA	38
LOW ALT PAN CAMERA	39
INFRARED SENSOR	40
AIRCRAFT SIMULATOR	41
CPS - CIPDU - POD INTERFACE	42
KA-99A Vg/H SWITCH POINTS	43
INPUTS TO AN/AAD-5 RECORDER	44
NITROGEN SERVICING UNIT	45
	46

TABLE OF CONTENTS (CONT'D)

AN/AAD-5 OPTICAL SYSTEM	47
IR SYSTEM OPERATION	48
LIFT LOADER ADAPTER ADU-400/E OPERATING CONTROLS AND FEATURES	49
F-14A AIRCRAFT/POD INTERFACE	50
F-14A/TARPS POD FUNCTIONAL RELATIONSHIP	51
FILM THREADING PATH AN/AAD-5 FILM MAGAZINE	52
AN/AAD-5 FILM FORMAT AND ANNOTATION ARRANGEMENT....	53
KA-99A BIT TIMING DIAGRAM	54
TARPS SENSOR CHECKOUT MATRIX	55
Vg/H SELECTION CIRCUIT-SIMPLIFIED LOGIC DIAGRAM ..	56
BODY BIT TEST FAIL	57
FILM MOTION BIT FAIL	58
MAGAZINE BIT TEST FAIL	59
ELECTRONICS UNIT BIT TEST FAIL	60
IRPA ORM SEQUENCE CHART	61



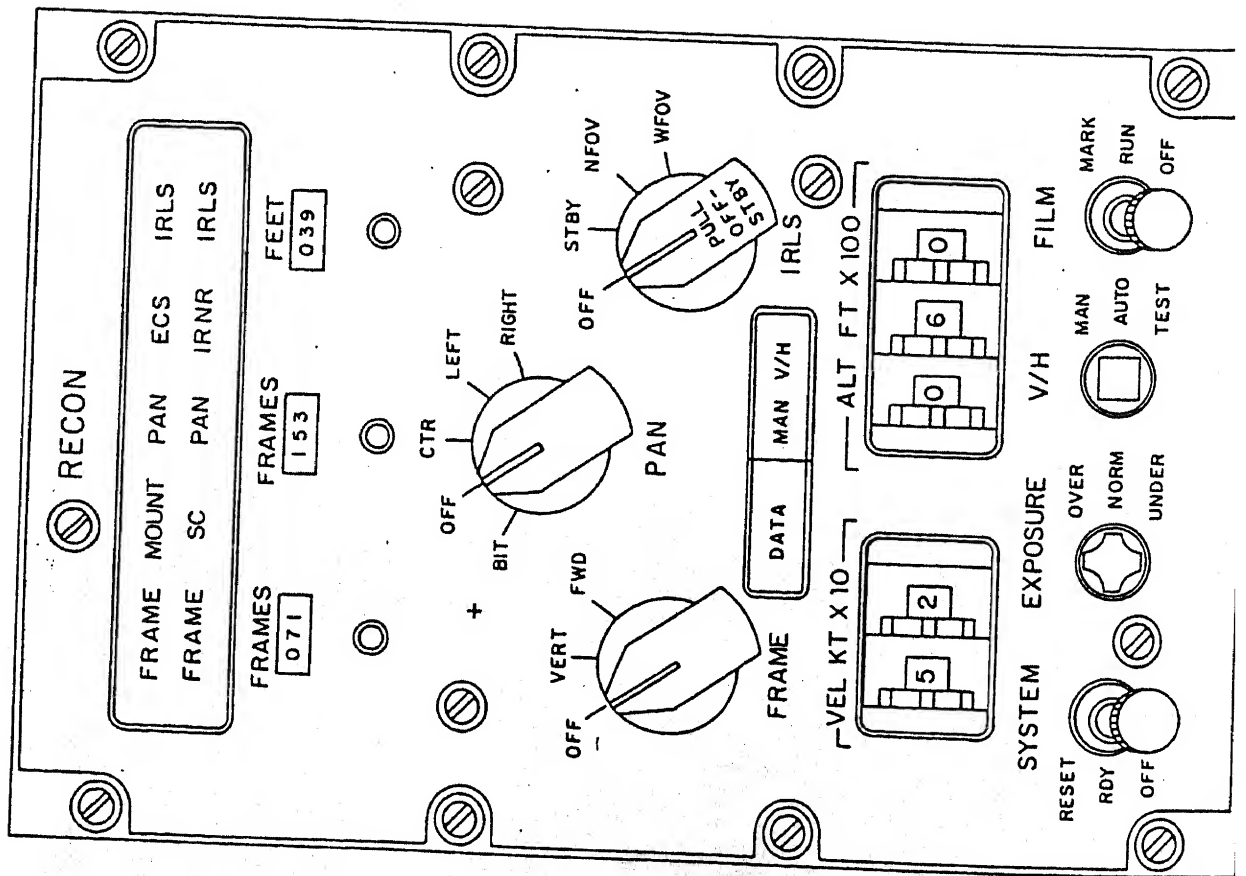
1. BAY 1
2. BAY 2
3. BAY 3
4. BAY 4
5. TAIL CAP
6. ADAPTER
7. COMPARTMENT HEATING DISCHARGE DUCT
8. NOSE CONE
9. WINDOW DEFOGGING DISCHARGE DUCT
10. FORWARD WINDOW
11. KS-87B FRAME CAMERA
12. LOWER WINDOW
13. WINDOW DEFOGGING DISCHARGE DUCT
14. CAMERA MOUNT BASE
15. VACUUM PUMP
16. KA-99A LOW ALTITUDE PANORAMIC CAMERA

17. PANORAMIC WINDOW
18. WINDOW DEFOGGING DISCHARGE DUCT
19. CRYOGENIC REFRIGERATION UNIT
20. INFRARED PERFORMANCE ANALYZER (IRPA)
21. POWER SUPPLY
22. IR DOOR (OPEN)
23. AN/AAD-5 INFRARED RECONNAISSANCE SET (IRRS)
24. CONTROL-INDICATOR - POWER DISTRIBUTION UNIT (CIPDU)
25. DATA DISPLAY SET (DDS)
26. ECS EXHAUST VENT
27. WINCH FOR PAN CAMERA
28. SAFETY INTERLOCK SWITCH
29. WINCH FOR IRRS

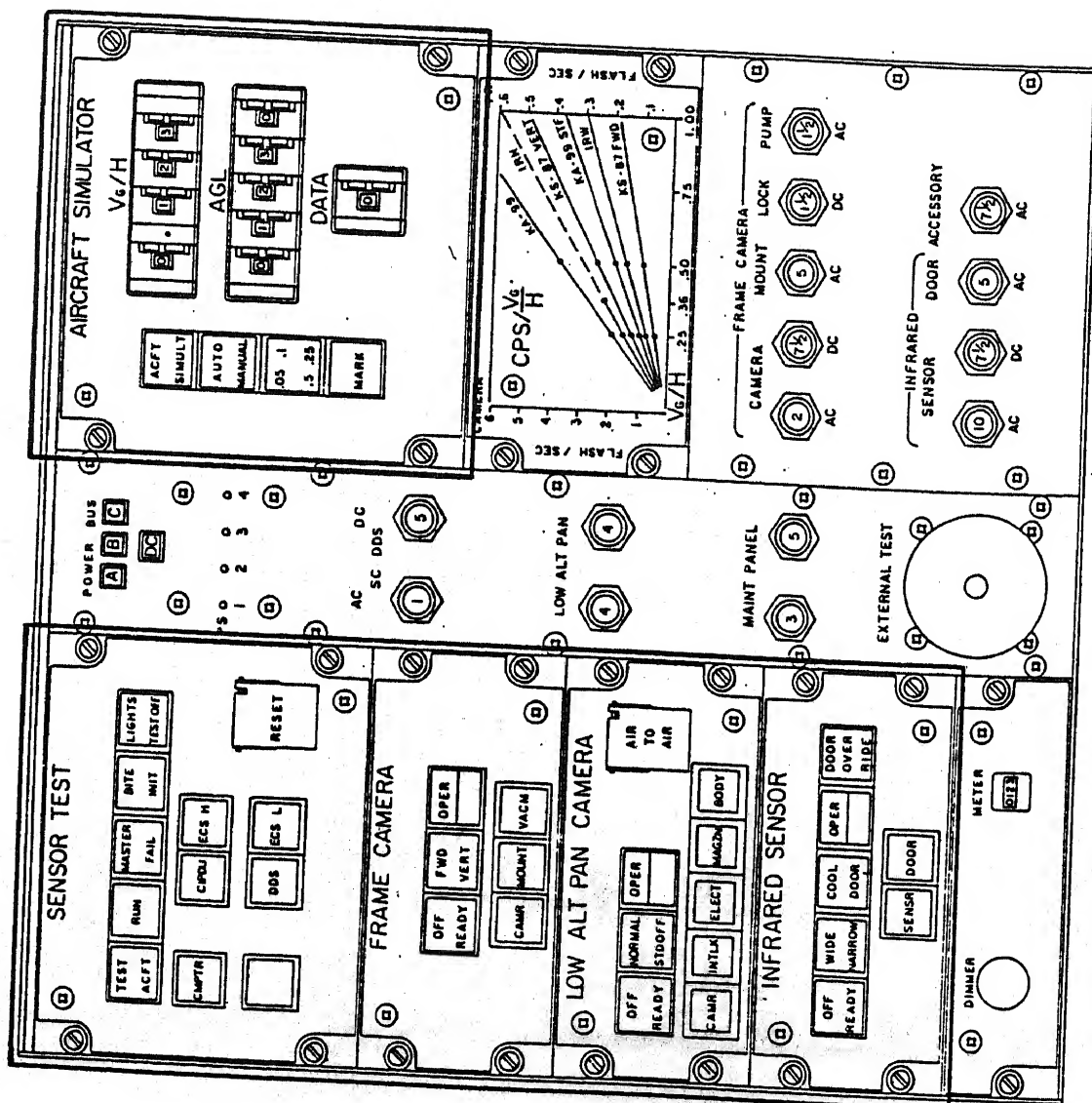
30. RHA J BOX
31. ECS TEST/PWR PANEL
32. COMPARTMENT AIR HEATER CONTROLLER
33. COMPARTMENT AIR FLOW CONTROLLER
34. DEFOGGER AIR FLOW CONTROLLER
35. DEFOGGER AIR HEATER CONTROLLER
36. WINDOW AIR FLOW MODULATING VALVE
37. DEFOGGER HEATERS (2)
38. WINDOW AIR FLOW SHUT - OFF VALVE
39. COMPARTMENT AIR FLOW MODULATING VALVE
40. COMPARTMENT HEATER
41. WATER SEPARATOR
42. ADAPTER SWITCH ASSEMBLY
43. CONTROLLER PROCESSOR SIGNAL (CPS)
44. TACTICAL INFORMATION DISPLAY (TID)

TARPS COMPONENT LOCATIONS

NOTE: ADAPTER NOT TO SCALE - EXPANDED TO SHOW GENERAL LOCATIONS







CLASS CODE

R - 2

S - 3

C - 7

T - 8

U - 9

MISSION LETTER CODE

STATION 1

CYCLE

5

0

0

7

0

9

3

EXP MODE

A/N

BCD

TIME PRESET

HOURS

1

0

2

0

MIN

0

TIME SET

BIT

0

STATION 2

CYCLE

1

8

0

0

0

0

0

EXP MODE

A/N

BCD

SQUADRON

2

3

4

5

STATION 3

CYCLE

3

7

0

5

0

0

3

EXP MODE

A/N

BCD

CLASS

DET

3

2

1

4

CODE DN-GR

N

BLK

E

STATION 4

CYCLE

7

5

0

2

5

0

3

EXP MODE

A/N

BCD

SORTIE

1

2

3

4

KA-99 MODE

A/N

BCD

DATE

DAY

2

1

0

7

9

MONTH

0

YEAR

1

2

MISSION LTR

2

EXP MODE

A/N

BCD

TDU

0

2

4

5

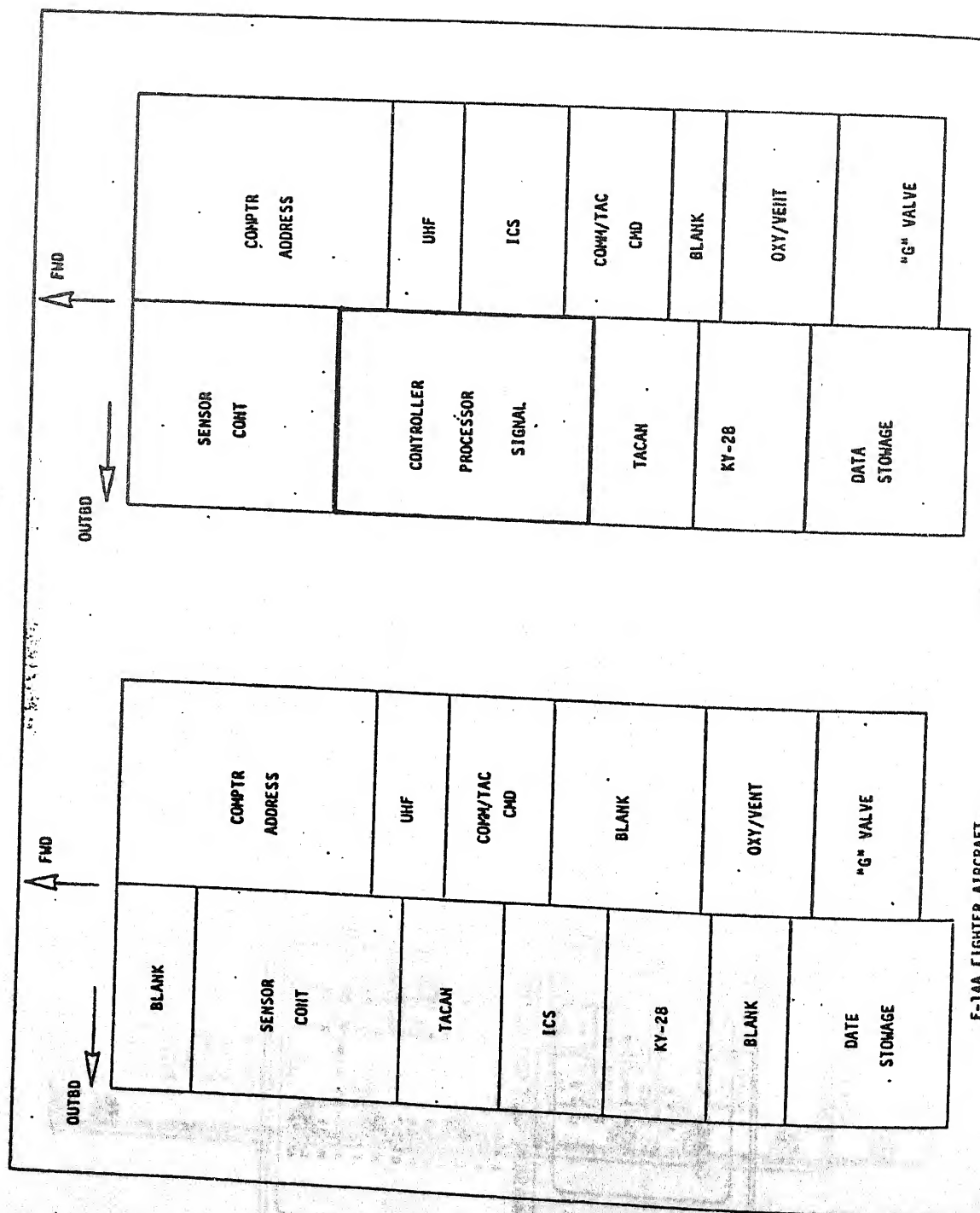
10

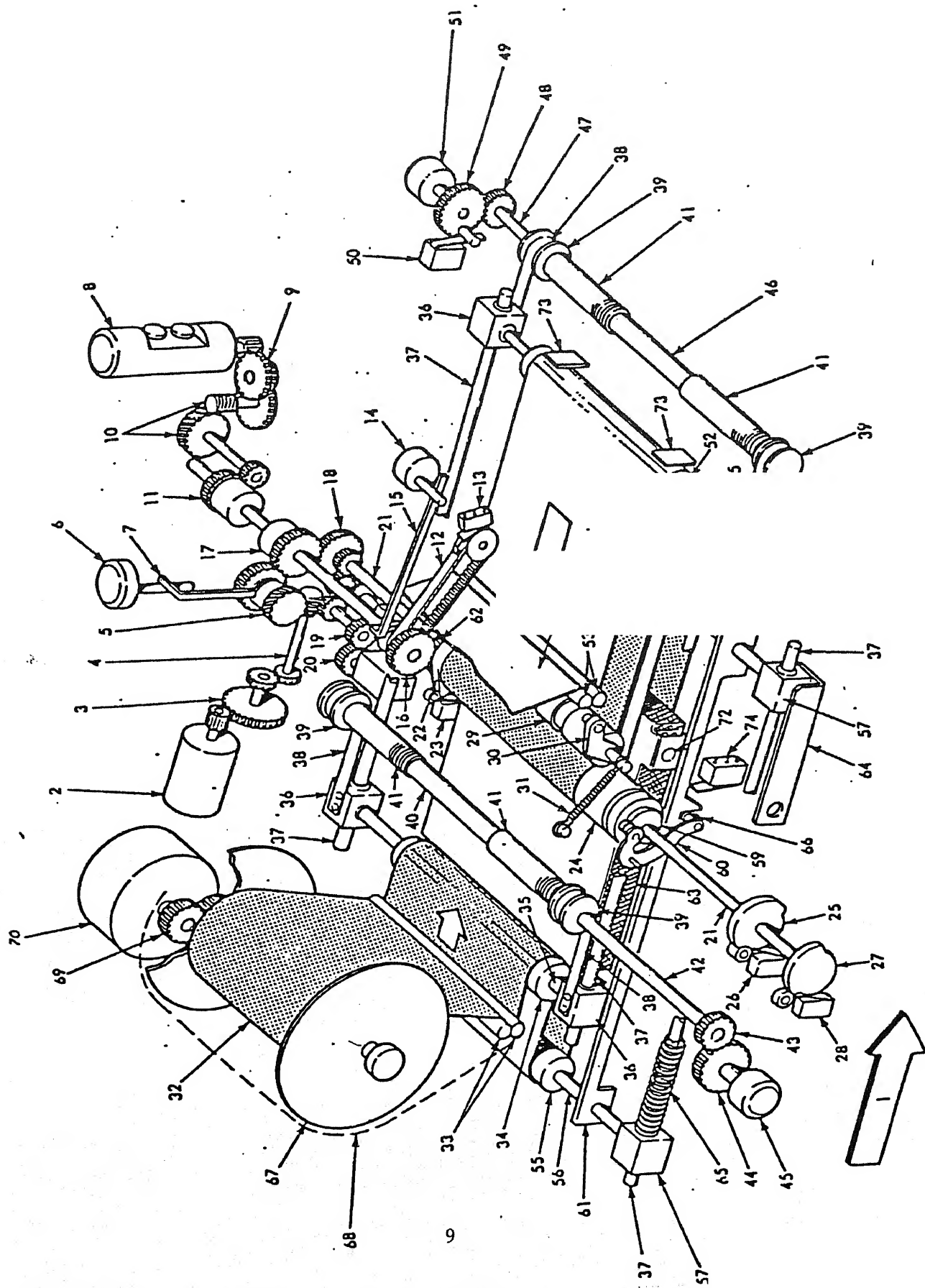
15

20

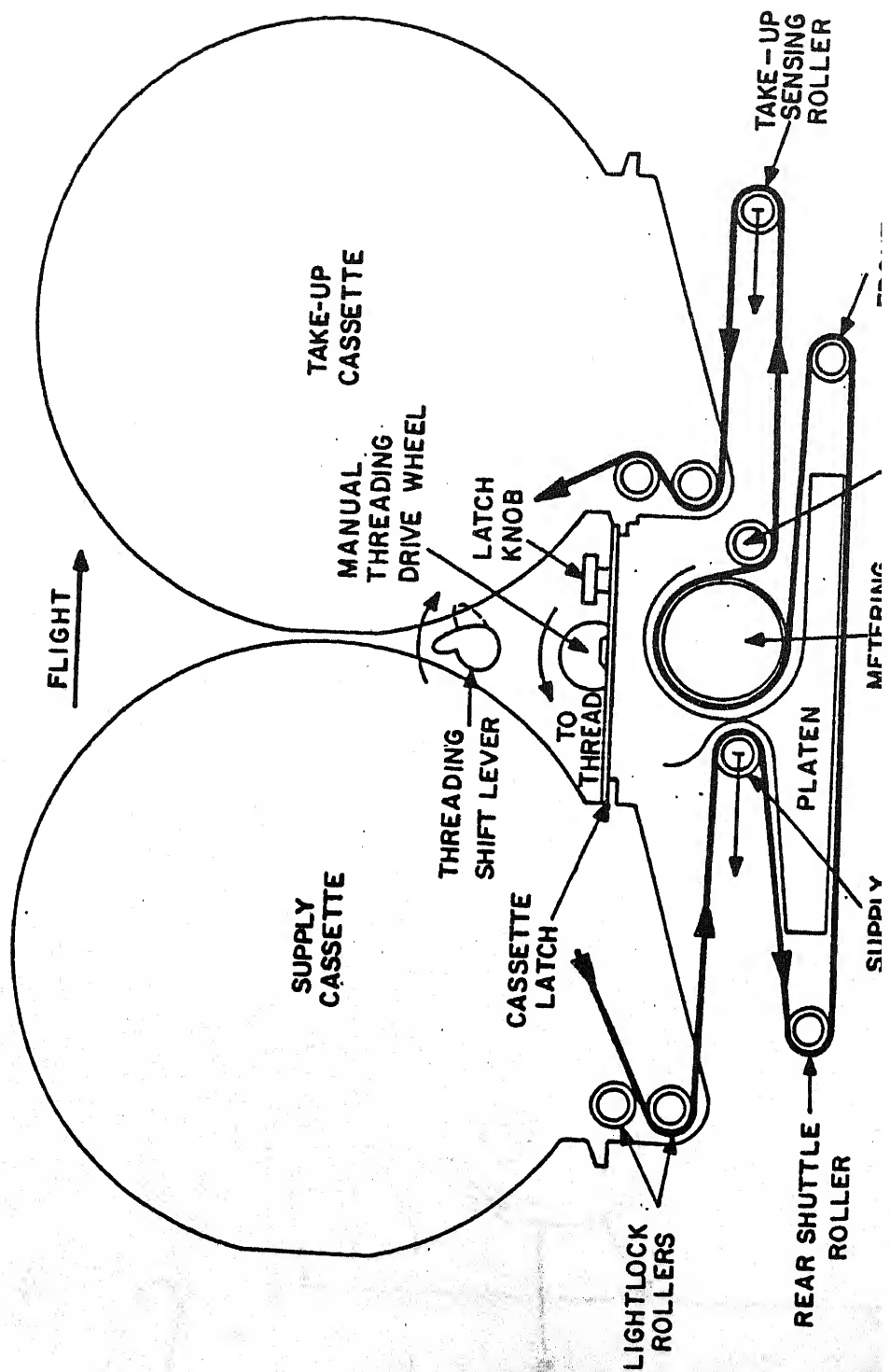
25

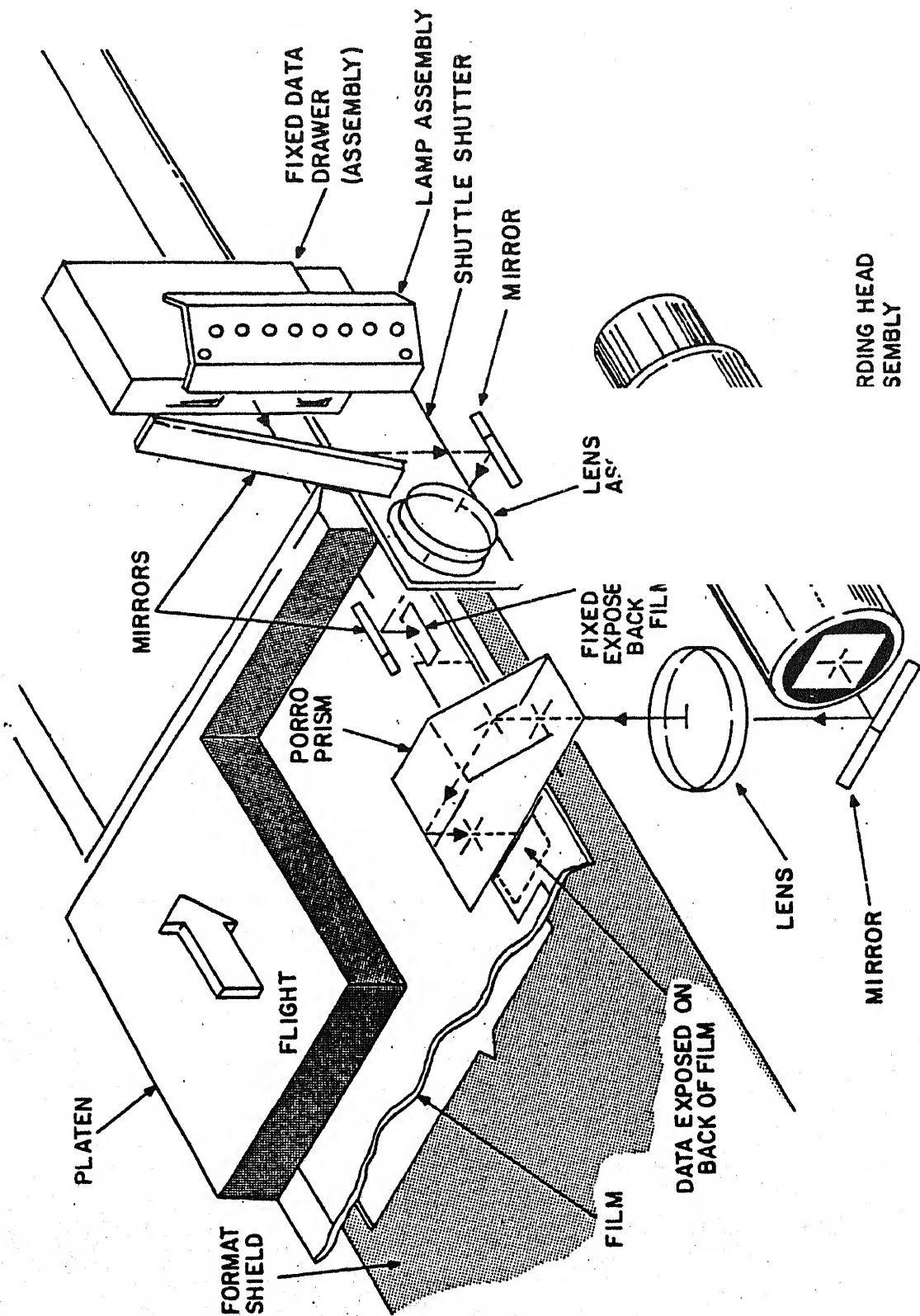
DDS CONTROL PANEL





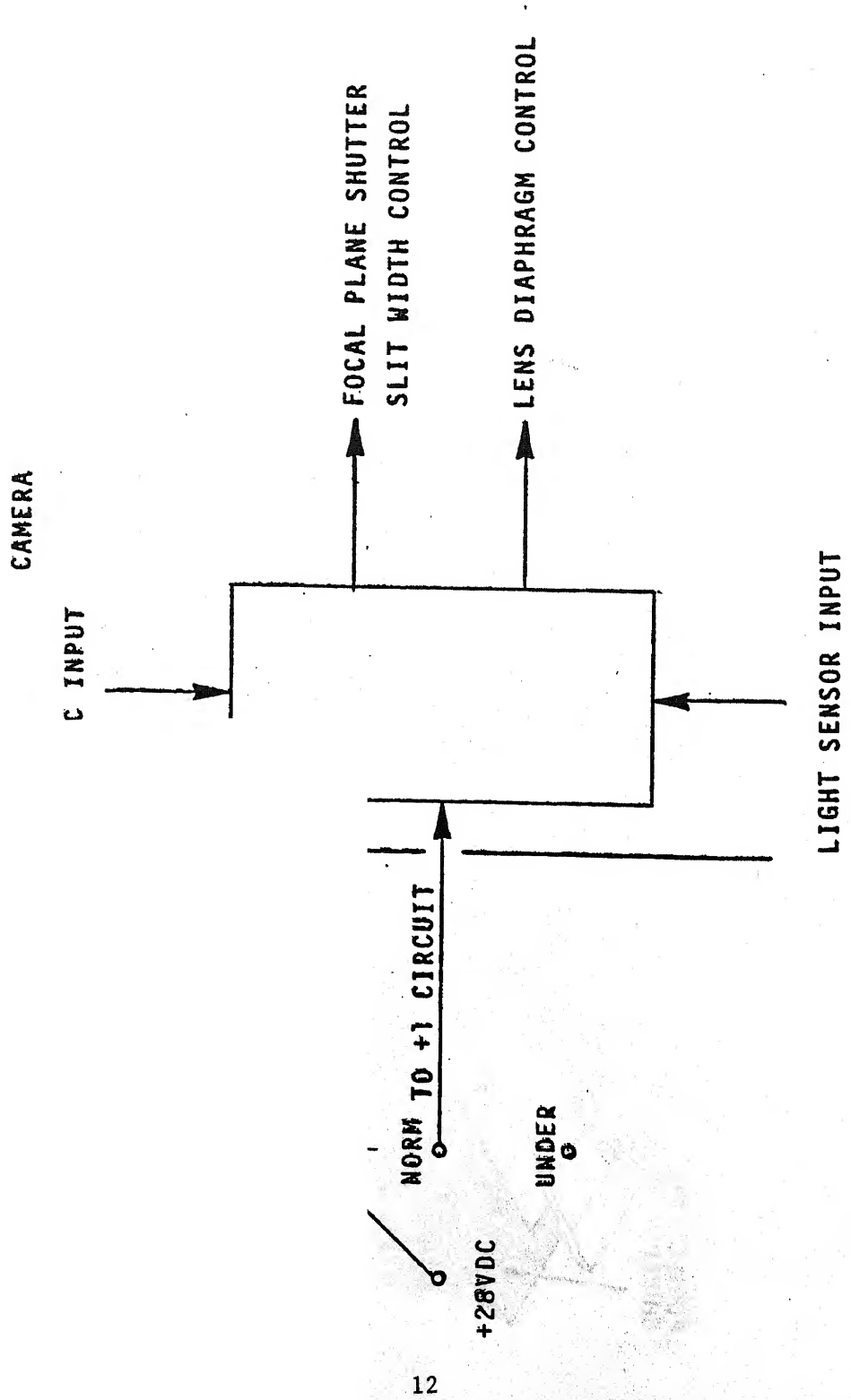
KS-87B FILM TRAN:

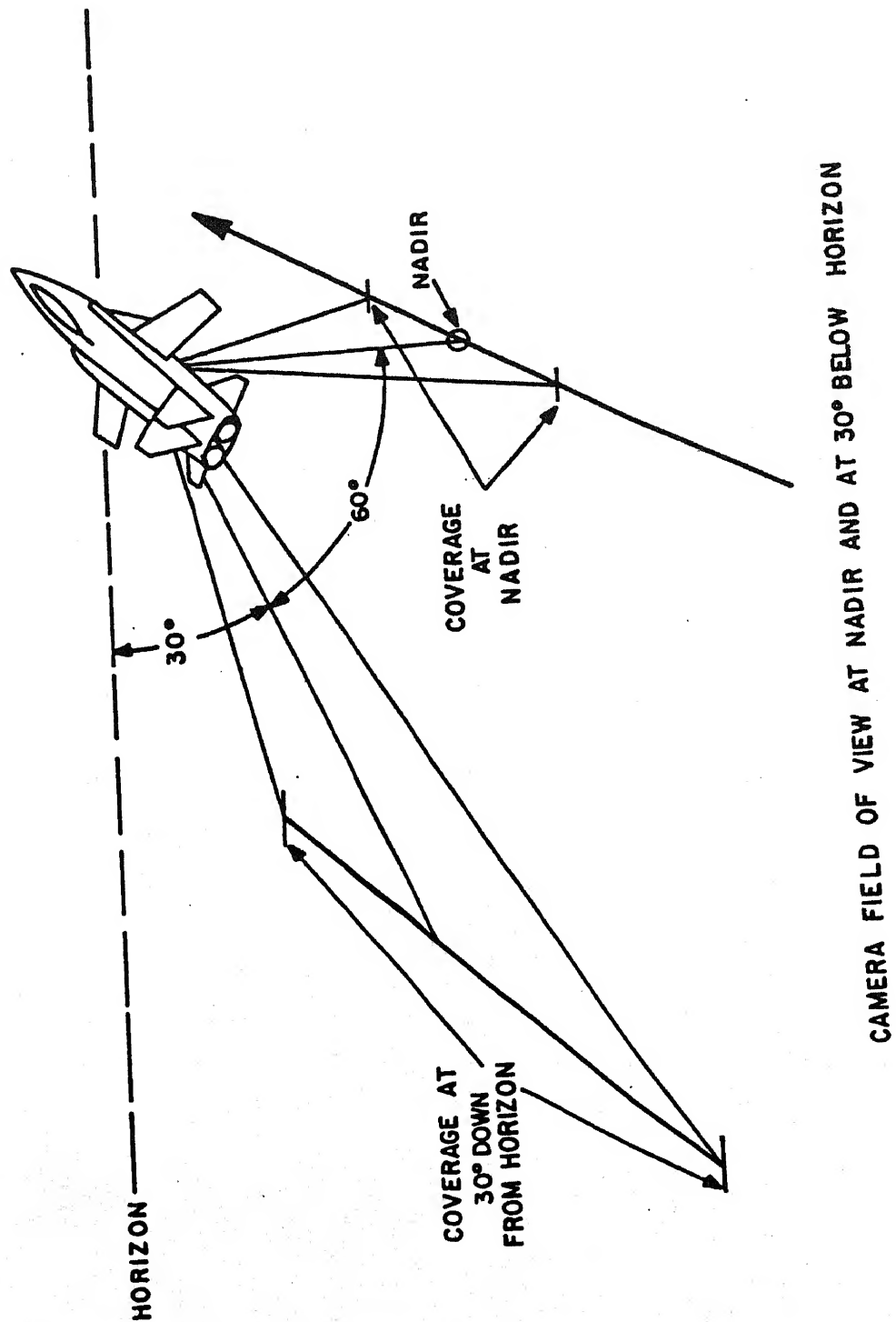


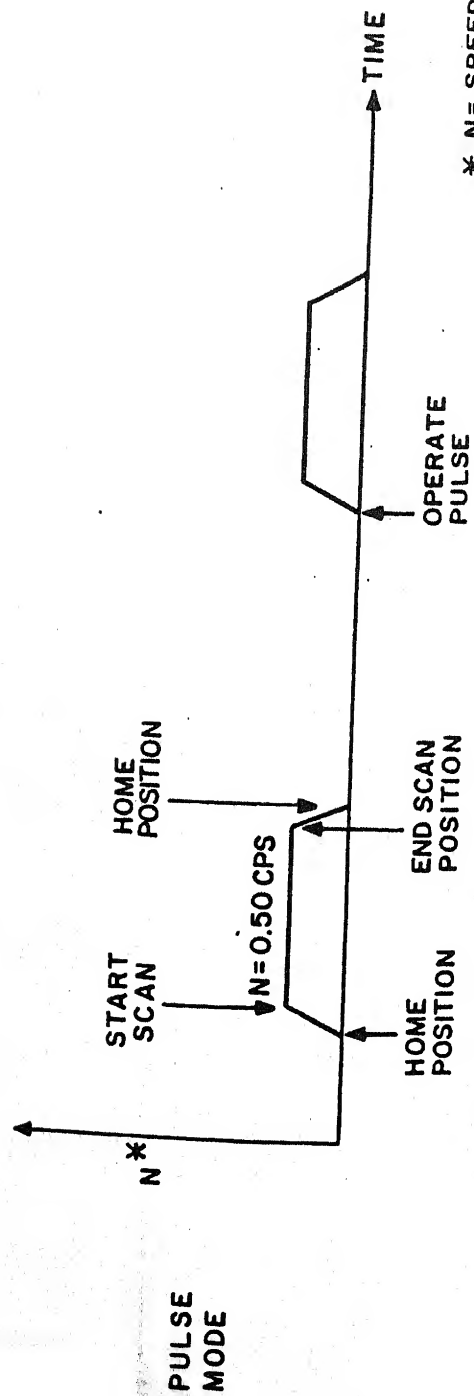
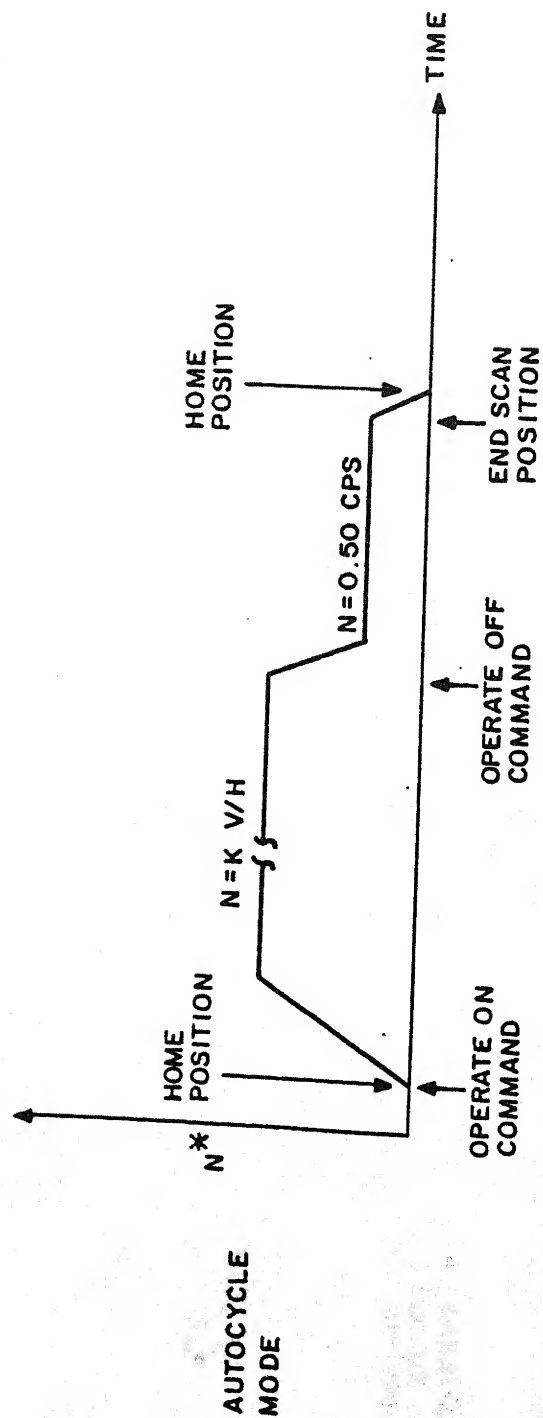


SCHEMATIC DIAGRAM

KS-87B CAMERA AUXILIARY DATA RECORDER

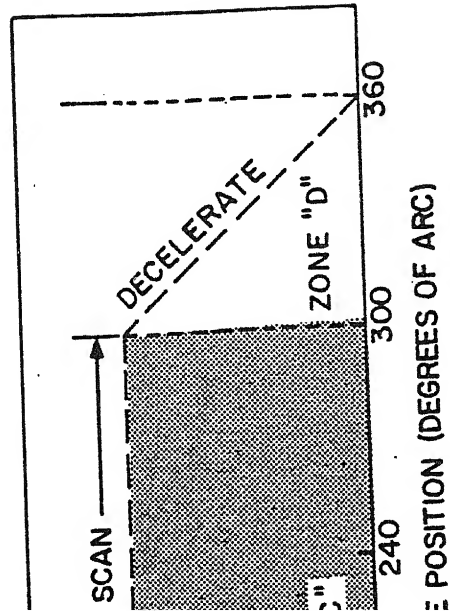
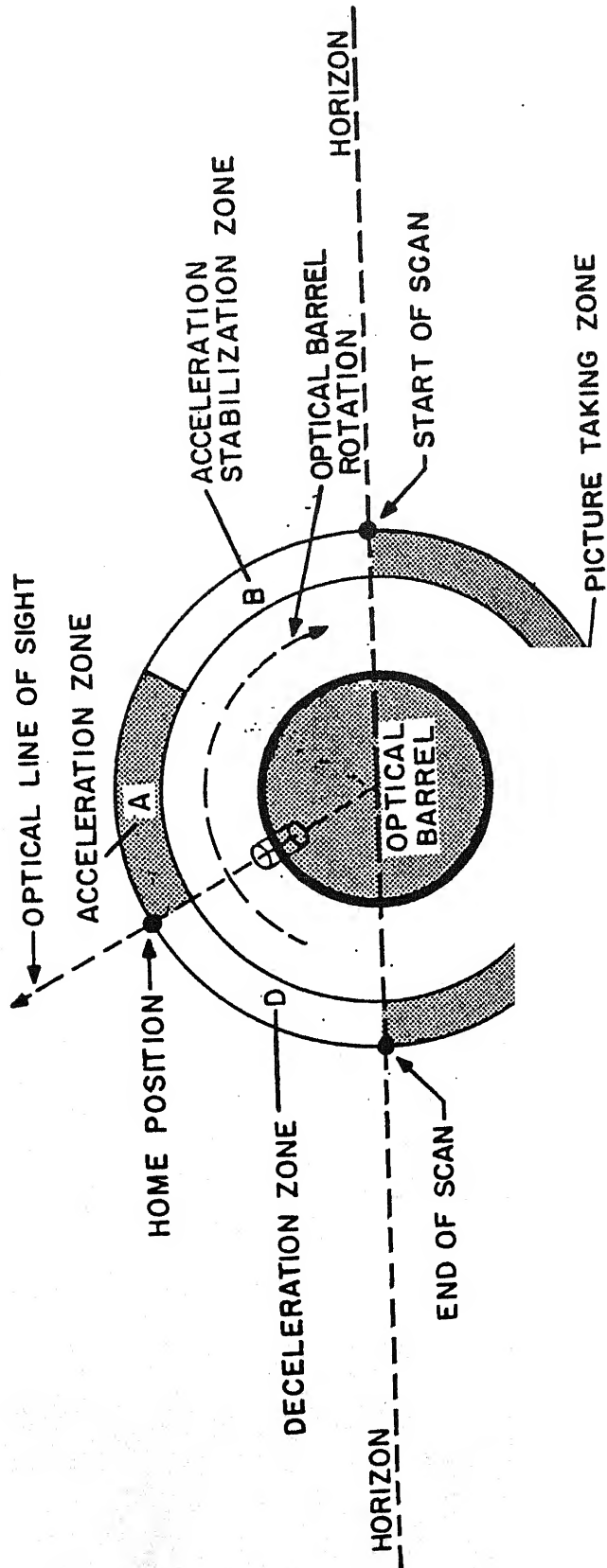




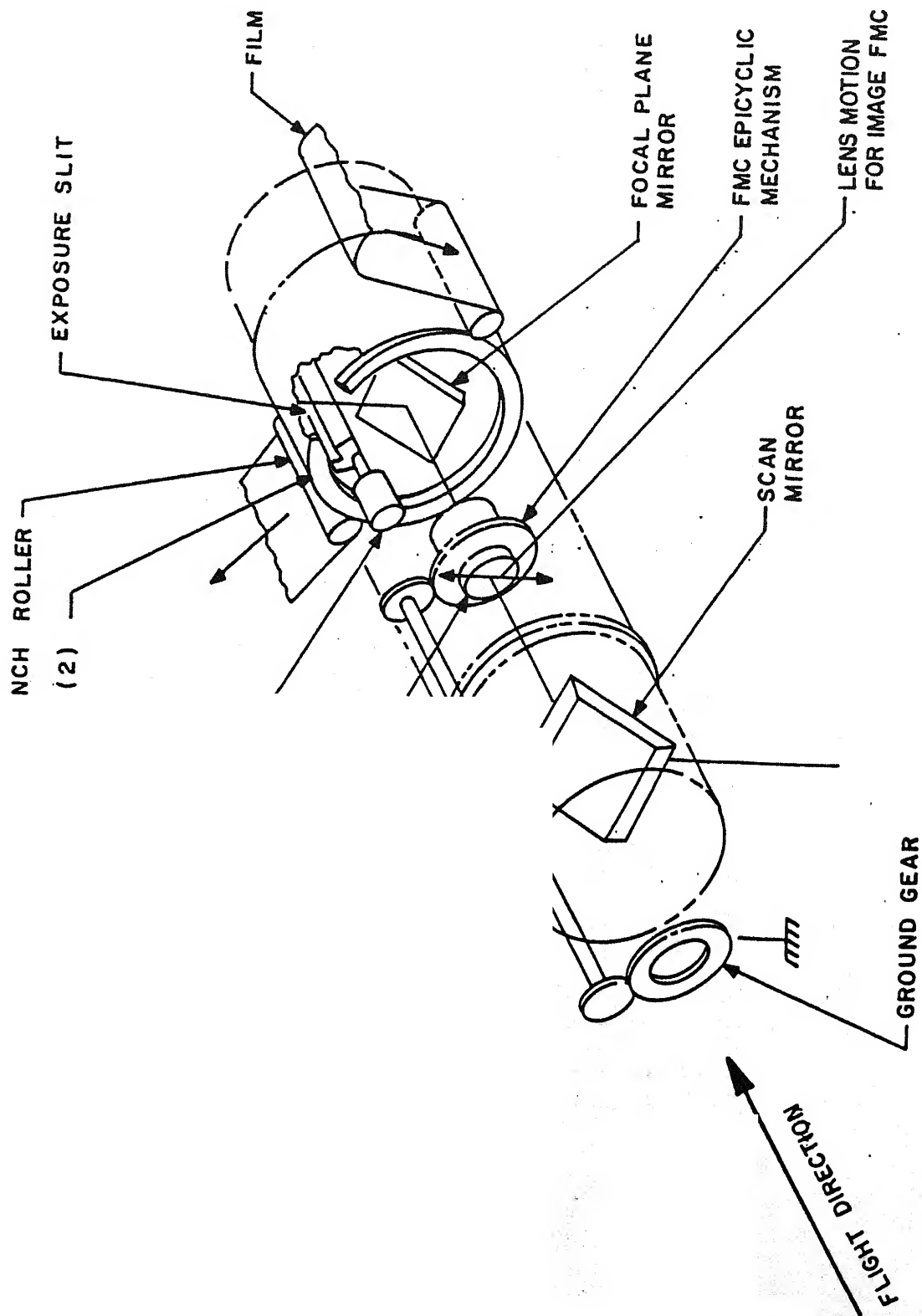


* N = SPEED OF OPTICAL
BARREL ROTATION

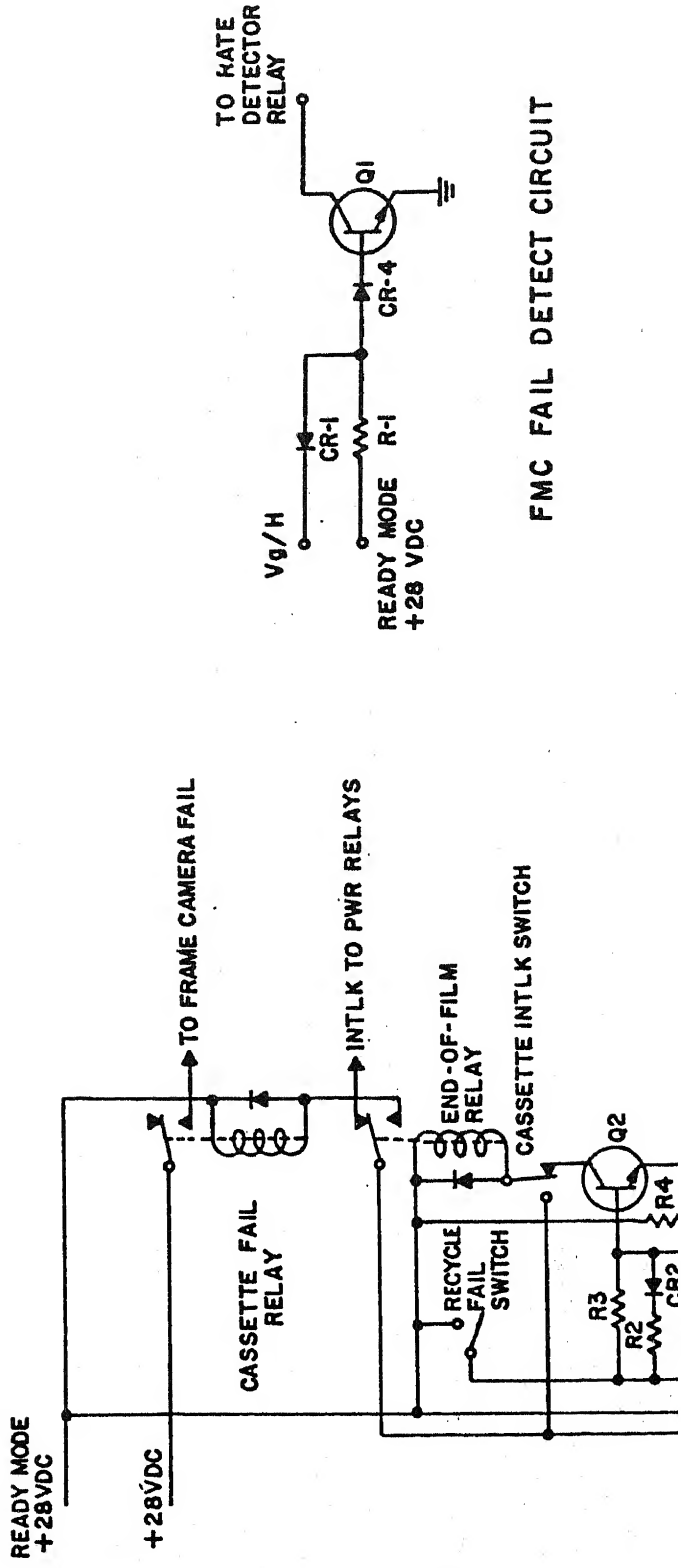
AUTOCYCLE MODE



SE MODE PROFILE



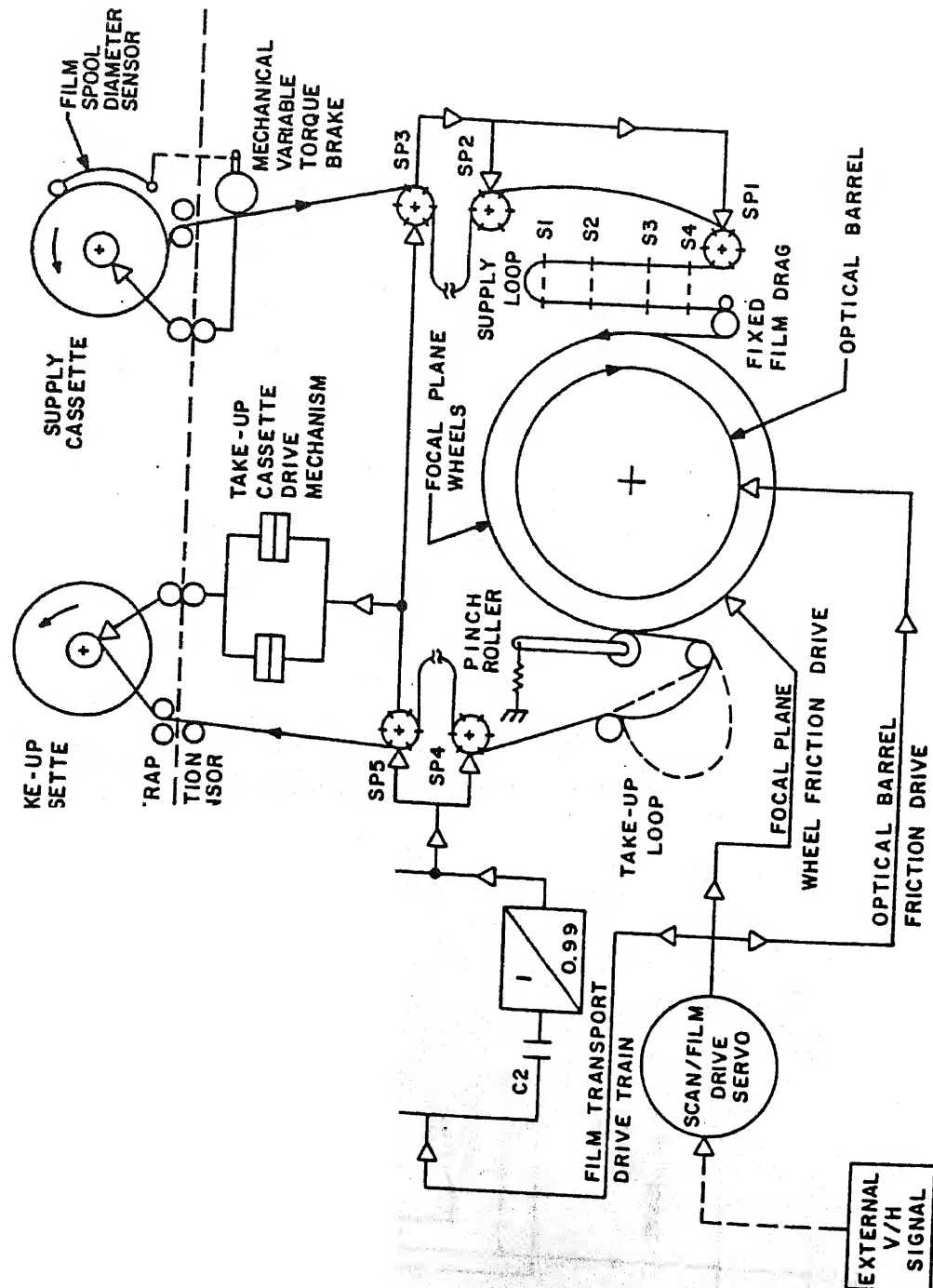
KA-99A OPTICAL BARREL ASSEMBLY



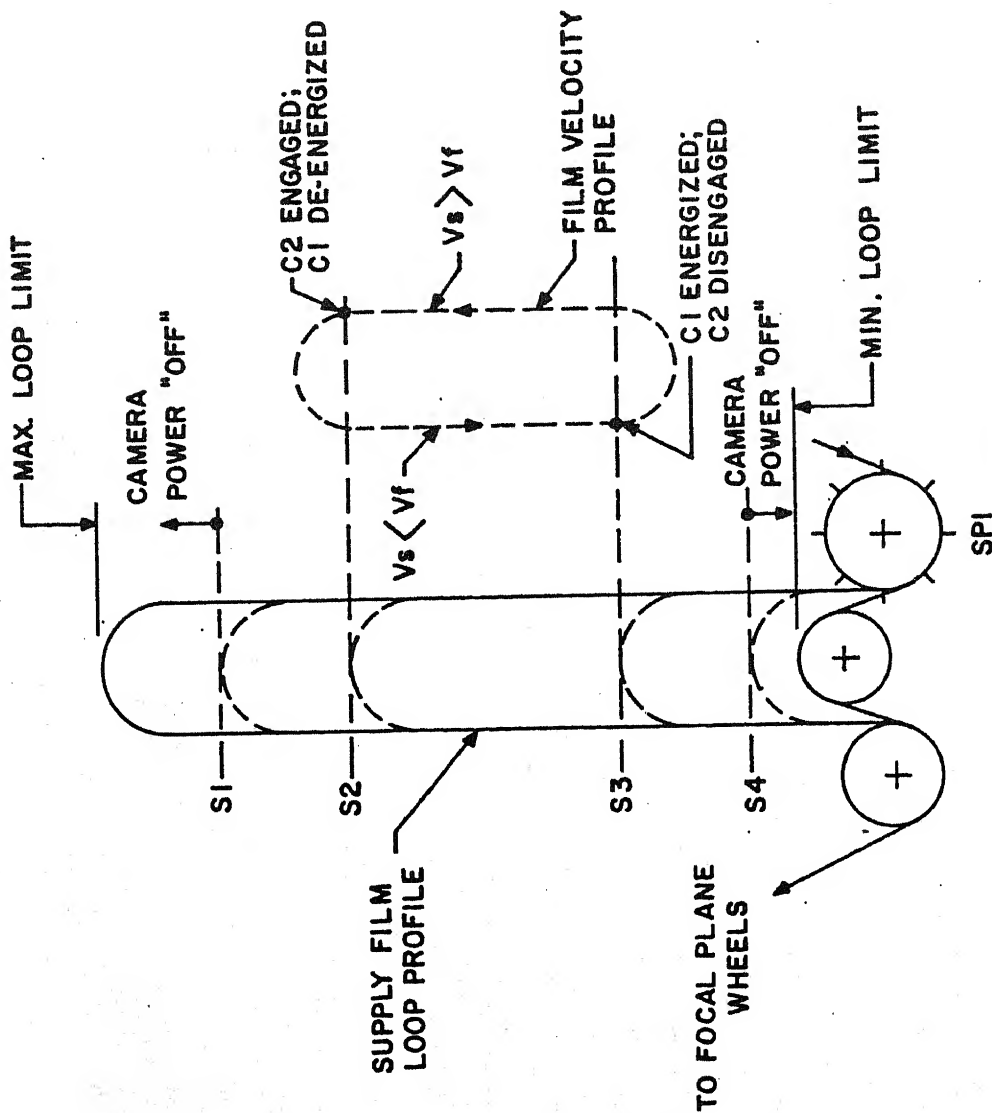
FMC FAIL DETECT CIRCUIT

NOTE: ALL SWITCHES/RELAYS SHOWN IN
NORMAL OPERATING POSITIONS
(NO MALFUNCTIONS).

RCUITS (SIMPLIFIED SCHEMATIC DIAGRAM)



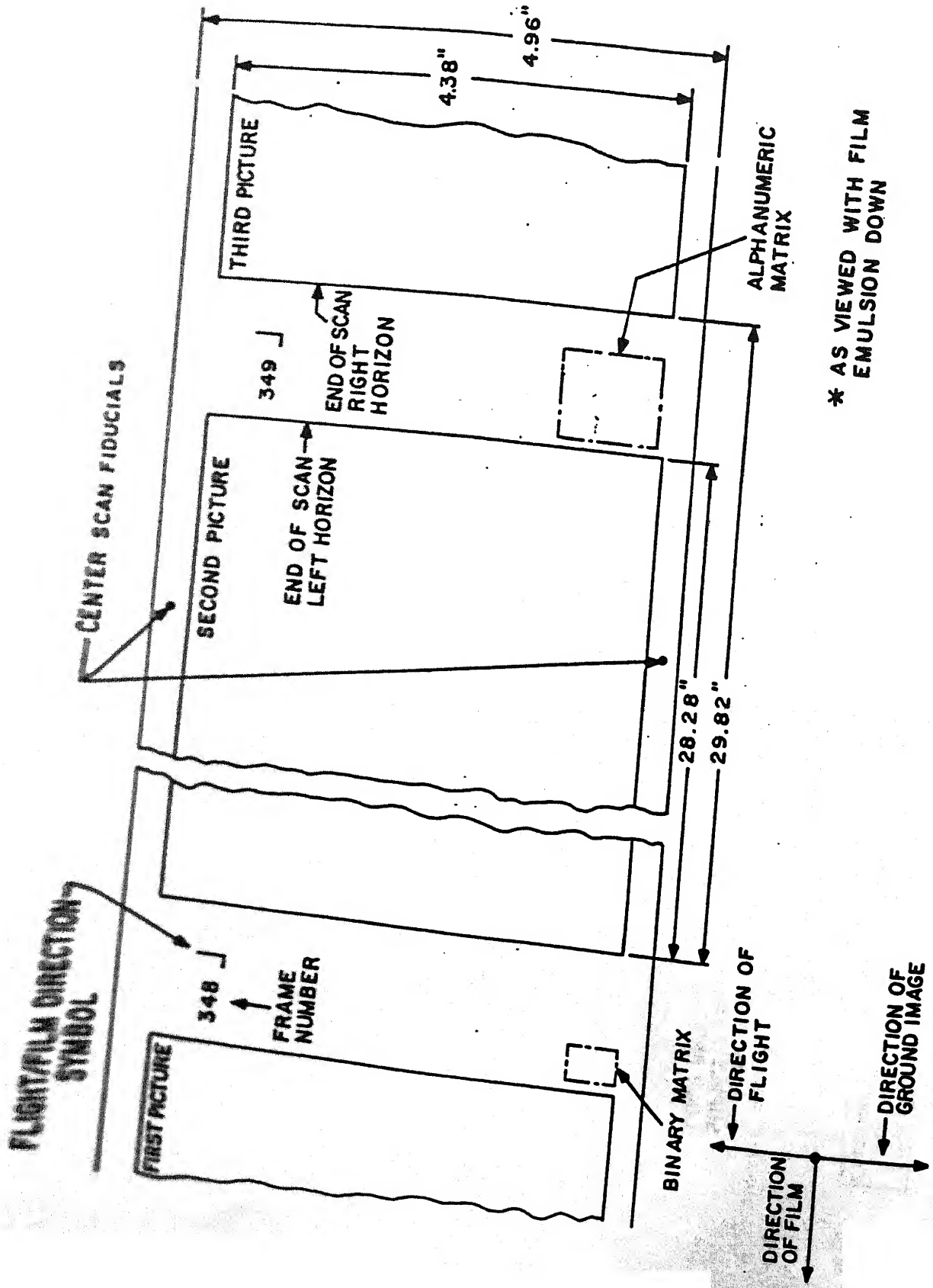
KA-99A FILM DRIVE SYSTEM



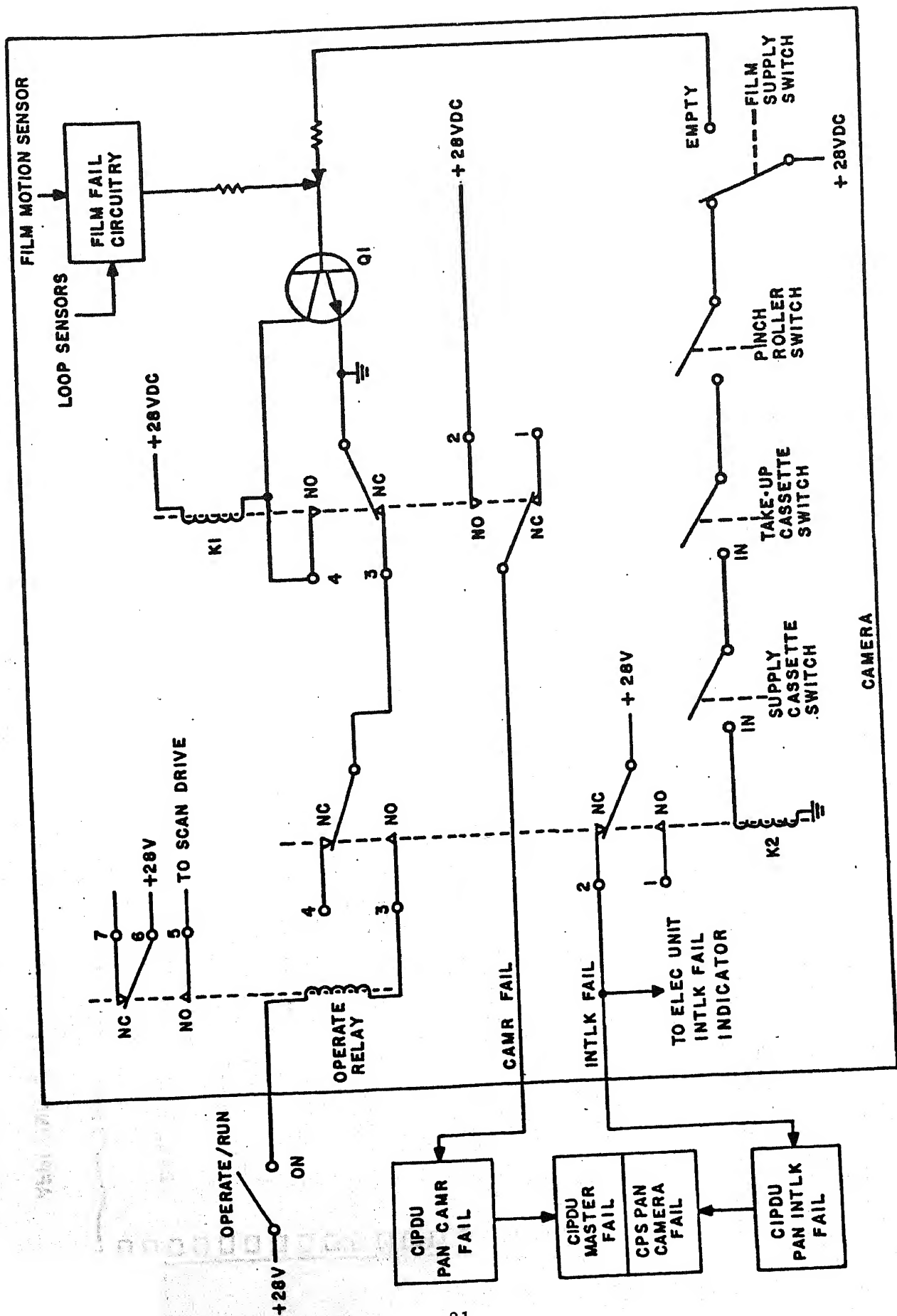
SYMBOLS USED

V_f - FILM VELOCITY IN THE FOCAL PLANE	SP - SPROCKET.
V_s - SPROCKET DRIVEN FILM VELOCITY	C1 - CLUTCH, ELECTRICAL (OVERSPEED)
S - SUPPLY LOOP SENSOR	C2 - CLUTCH, MECHANICAL (UNDERSPEED)

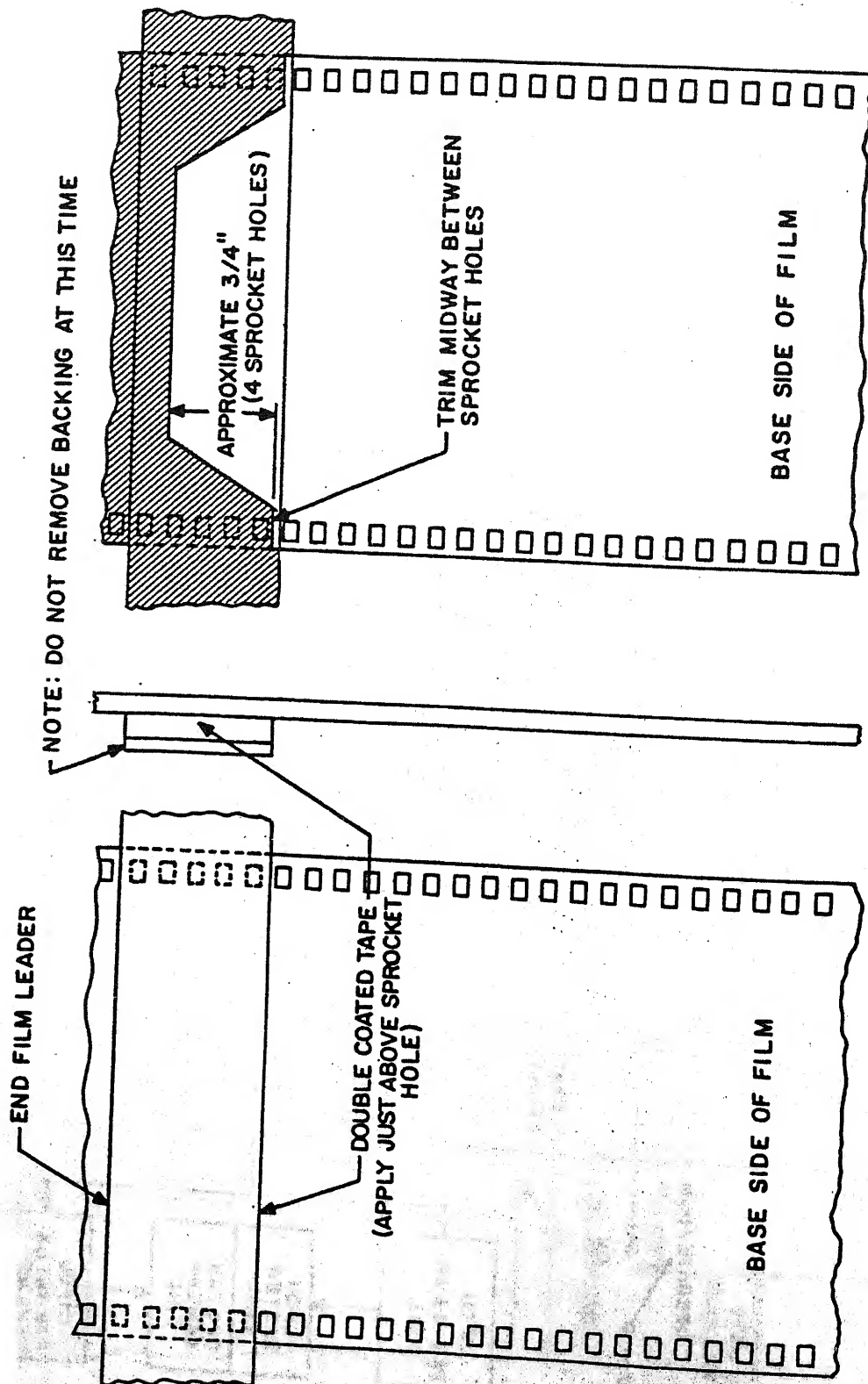
KA-99A FILM LOOP DETECTION SYSTEM



* AS VIEWED WITH FILM
EMULSION DOWN



KA-99A FAIL CIRCUITS (SIMPLIFIED)



APPLYING DOUBLE COATED TAPE

TRIMMING FILM AND TAPE EDGES

PREPARATION OF KA-99A FILM LEADER FOR LOADING

INDEX

0 1 2 3 4 5 6

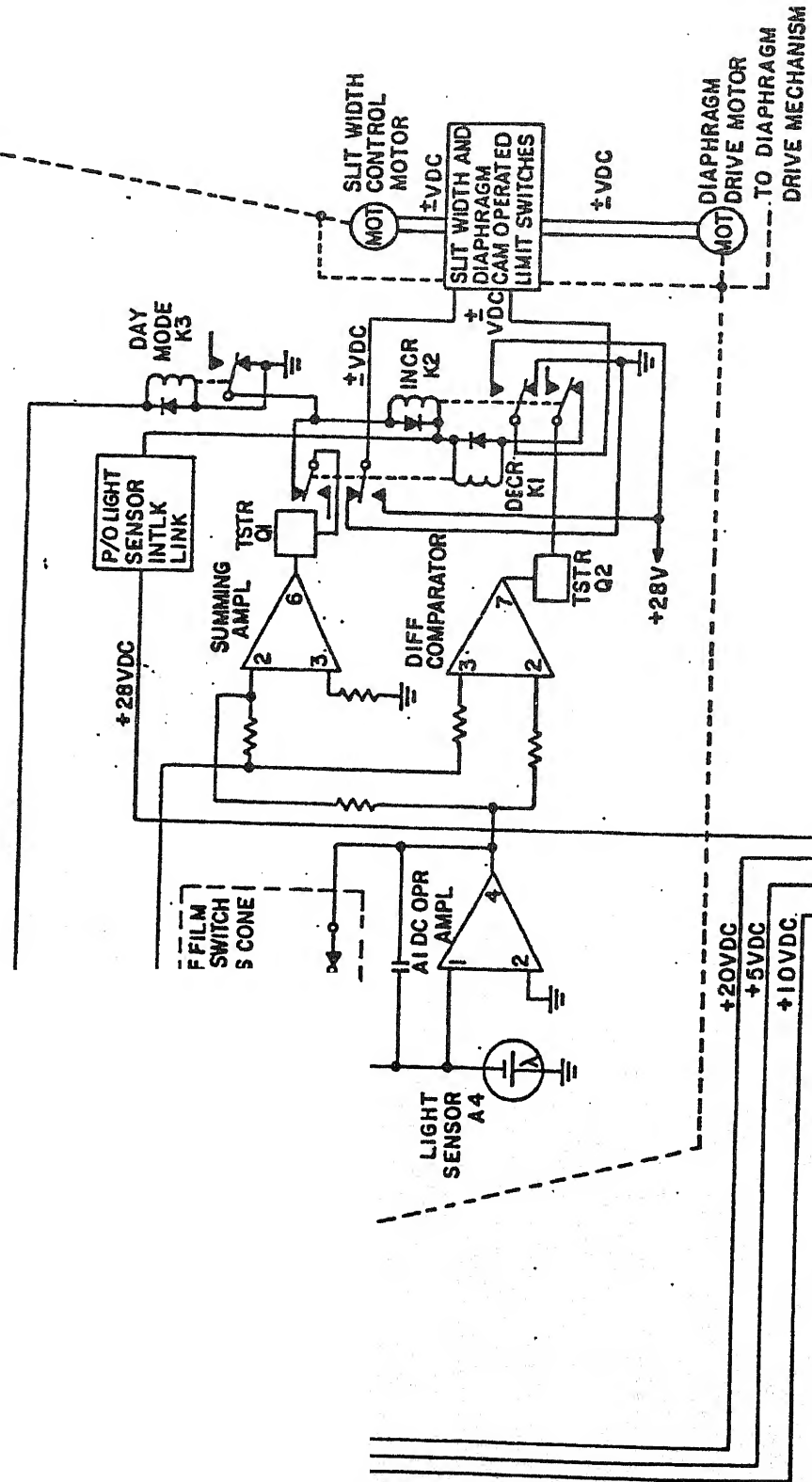
TIONS

MAJOR COLUMN 3				MAJOR COLUMN 2				MAJOR COLUMN 1			
DATE				TIME							
DAY [UNITS TENS]				(FIXED ZERO) TENS				TENTHS • 1			
MONTH [UNITS TENS]				HUNDREDS				SEC [UNITS • 3			
YEAR [UNITS TENS]				THOUSANDS				TENS • 4			
				TEN THOUSANDS				MIN [UNITS • 5			
								TENS • 6			
				TENTHS				HRS [UNITS • 7			
				UNITS				TENS • 8			
				TENS				• 9			
				HUNDREDS				SIGN • 10			
								TENTHS • 11			
				SIGN				UNITS • 12			
				TENTHS				MIN [TENS • 13			
								UNITS • 14			
				UNITS				DEC [TENS • 15			
				TENS				• 16			
								SIGN • 17			
				SIGN				TENTHS • 18			
				TENTHS				MIN [UNITS • 19			
				UNITS				TENS • 20			
				TENS				UNITS • 21			
								TENS • 22			
				SIGN				HUNDREDS • 23			
				TENTHS				• 24			
				UNITS				(FIXED ZERO) • 25			
				TENS				TENS • 26			
								HUNDREDS • 27			
				THOUSANDTHS				THOUSANDS • 28			
				HUNDREDTHS				TEN THOUSANDS • 29			
				TENTHS				• 30			
				UNITS				RA/CA • 31			
								• 32			

TIME CODE		TIME			SECONDS	
Z		HOURS	MINUTES			
LATITUDE		LONGITUDE		SPECIAL INTEREST		
N or S	DEGREE	MINUTES		RADAR OR CALCULATED AGL ALT.		
E or W	DEGREE	MINUTES		R. or C.		
				FEET		
				X		
DRIFT		HEADING		CLASS CODE FOREIGN		
+ or -	DEGREE	H				
PITCH		ROLL		NO		
+ or -	DEGREE	+ or -	DEGREE	CODE		
				FOREIGN		
DATE		YEAR		DN		
DAY	MONTH			EXCLUSIONS GRADING		
				MISSION LETTER SORTIE		
AA	AA	AA	AA	E		

ALPHANUMERIC FORMAT

TO CURTAIN SLIT
WIDTH DRIVE MECHANISM



FROM
POWER SUPPLY

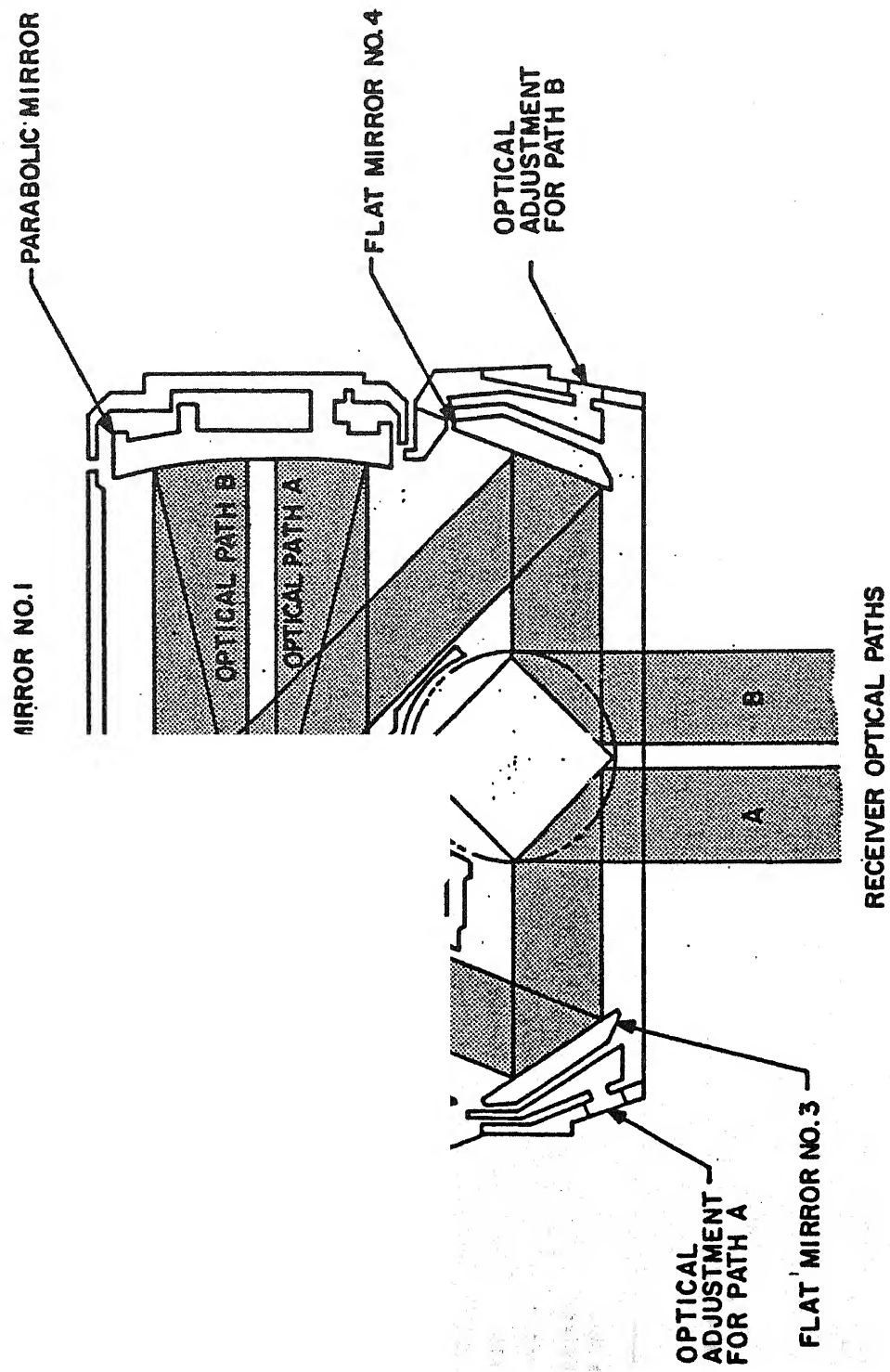
DDS CAMERA CONTROL OPERATIONAL MODES

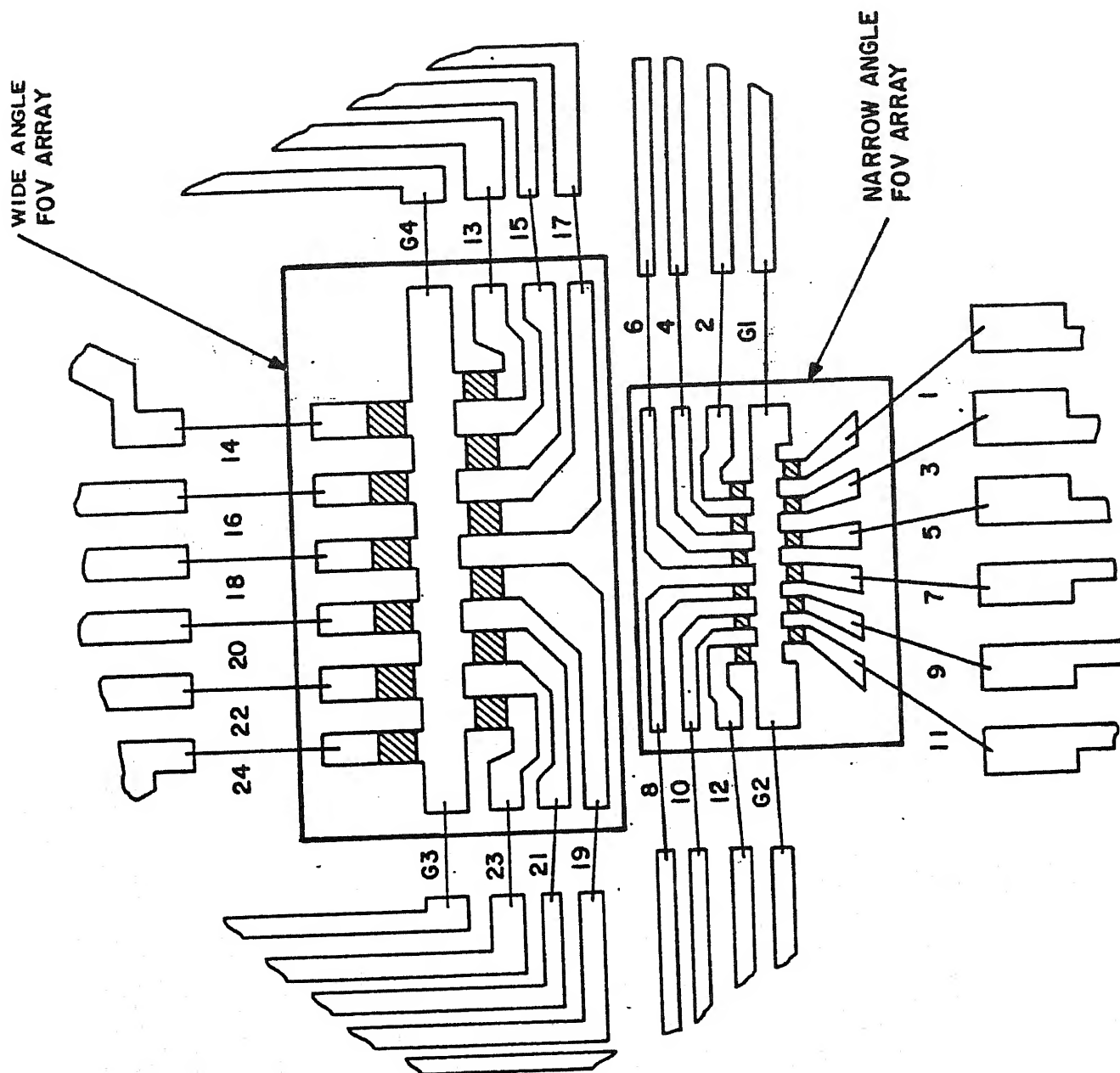
CONDITION	Data Annotated		Vg/H Used and Annotated	KA-99A Focusing	FMC Voltage (FMC scale factor x Vg/H source)	CYCLE RATE Pulses* (Cycle scale factor) x Vg/H source)	Backup ** Indicator Output
	BCD	A/N					
Normal	Computer Data		Computer Vg/H	AGL	Source - Computer Vg/H		Open
No Computer Data (NO address update)	Blanks	?	Backup Vg/H	6000 ft	Source - Backup Vg/H		Ground
Computer FAIL	Blanks	?	Backup Vg/H	6000 ft	Source - Backup Vg/H		Ground
All Zeros V/gH (Rest of Computer data is OK)	Computer Data		Backup Vg/H	AGL	Source - Backup Vg/H		Ground
Manual Vg/H selected	Computer Data		Backup Vg/H	AGL	Source - Backup Vg/H		Ground
Vg/H Input over 1.5	Computer Data		1.5	AGL	Source - Vg/H of 1.5		Open

* Max cycle rate frequency regardless of inputs - 8 Hz

** Output from DDS to CPS:

1. Open - backup Vg/H not in use (MAN Vg/H indicator OFF)
2. Ground - backup Vg/H in use (MAN Vg/H indicator ON)

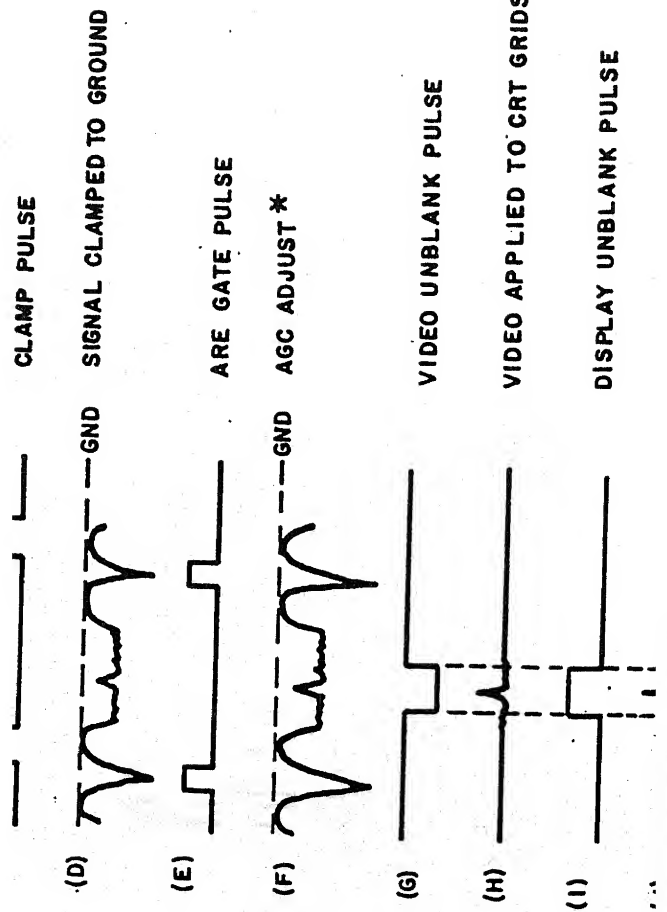




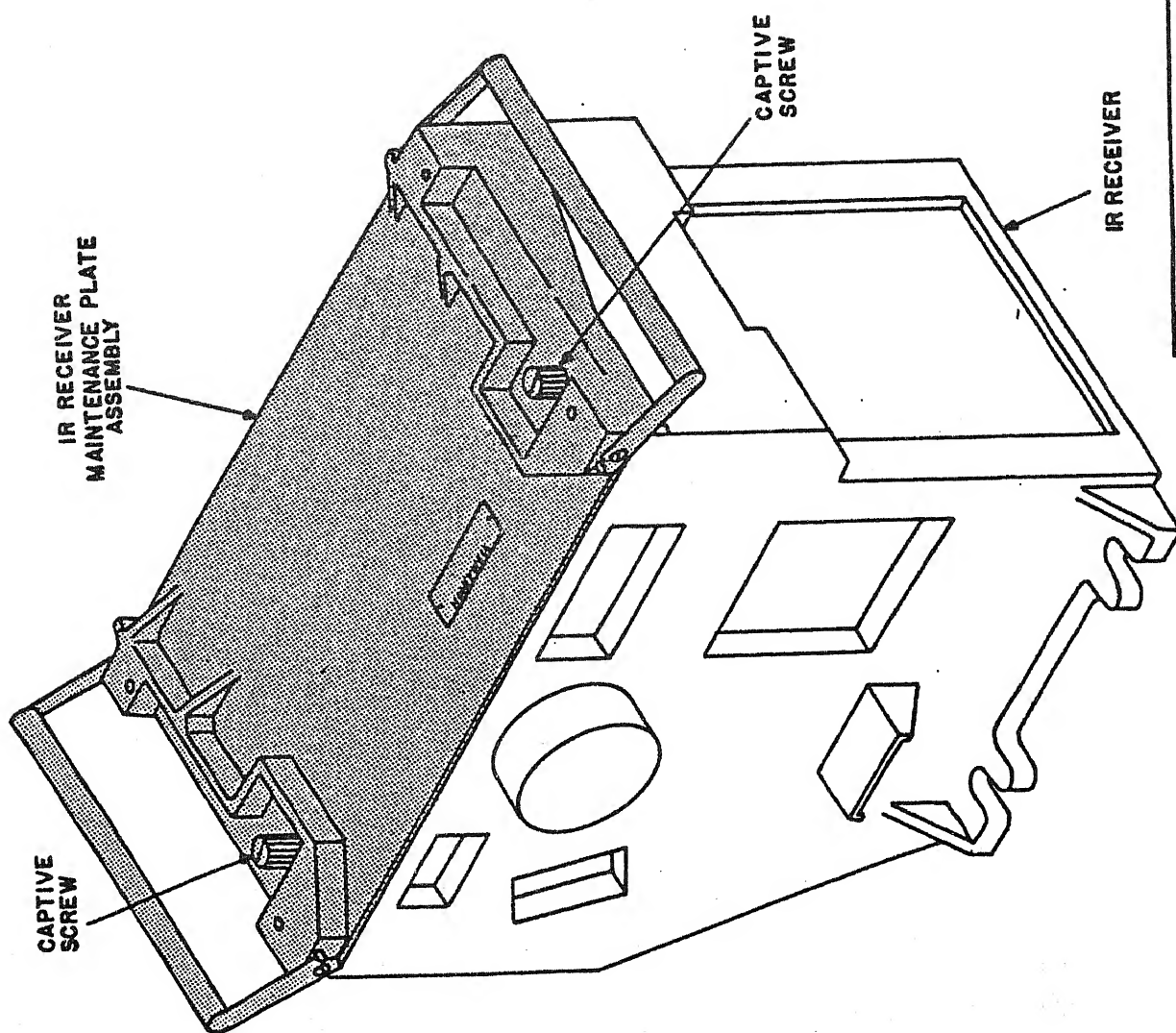
AN/AAD-5 RECEIVER DETECTOR ARRAY

E PULSE FROM SPIN MOTOR ENCODER

PREAMPLIFIERS

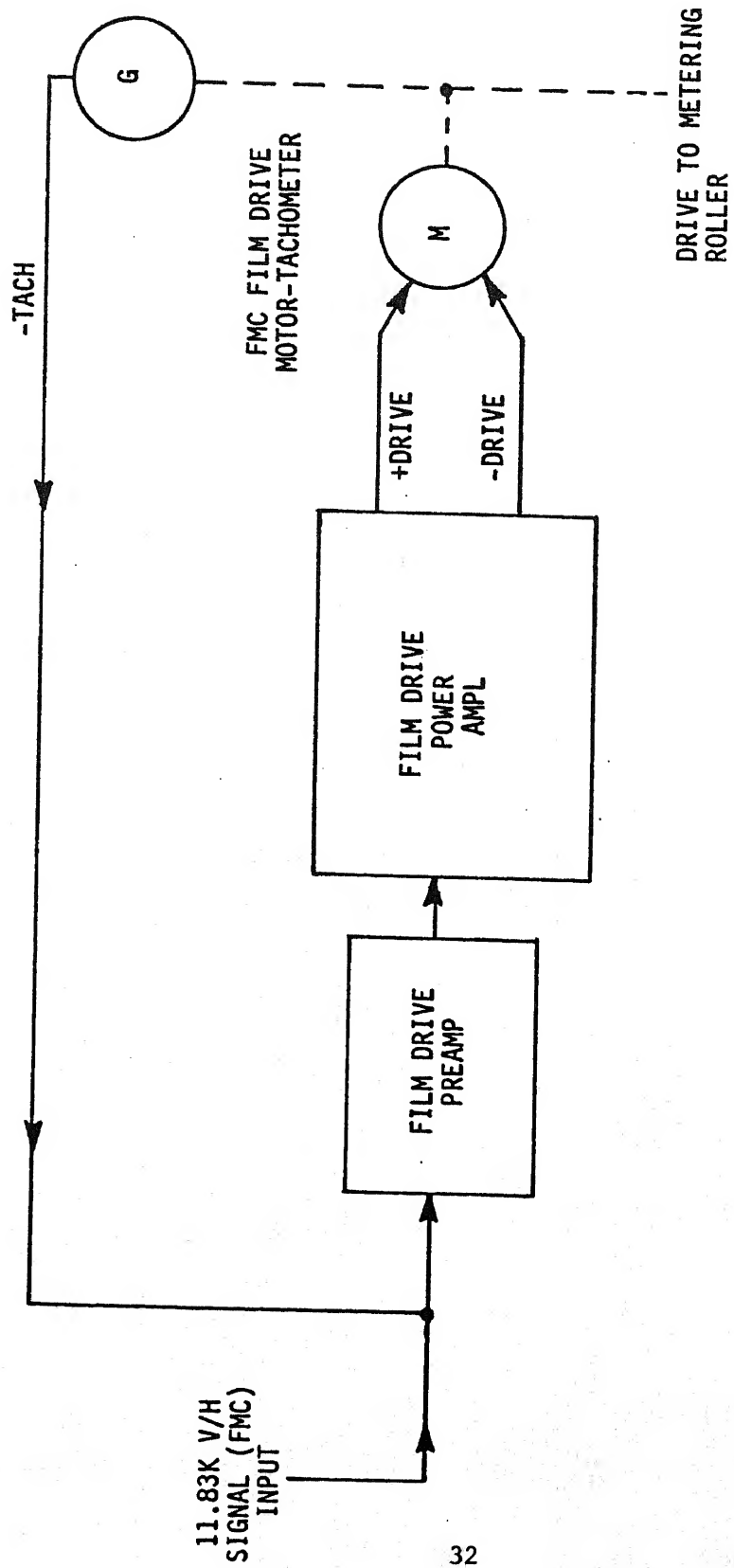


* DURING THE ARE GATE ON TIME, THE DIFFERENCE BETWEEN THE SAMPLED COLD SPIKE AND AN

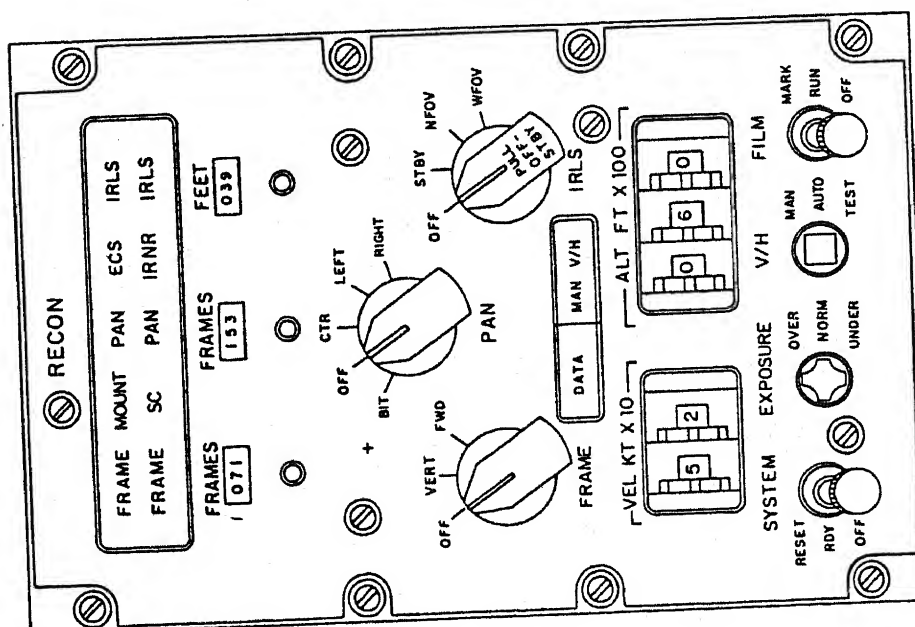
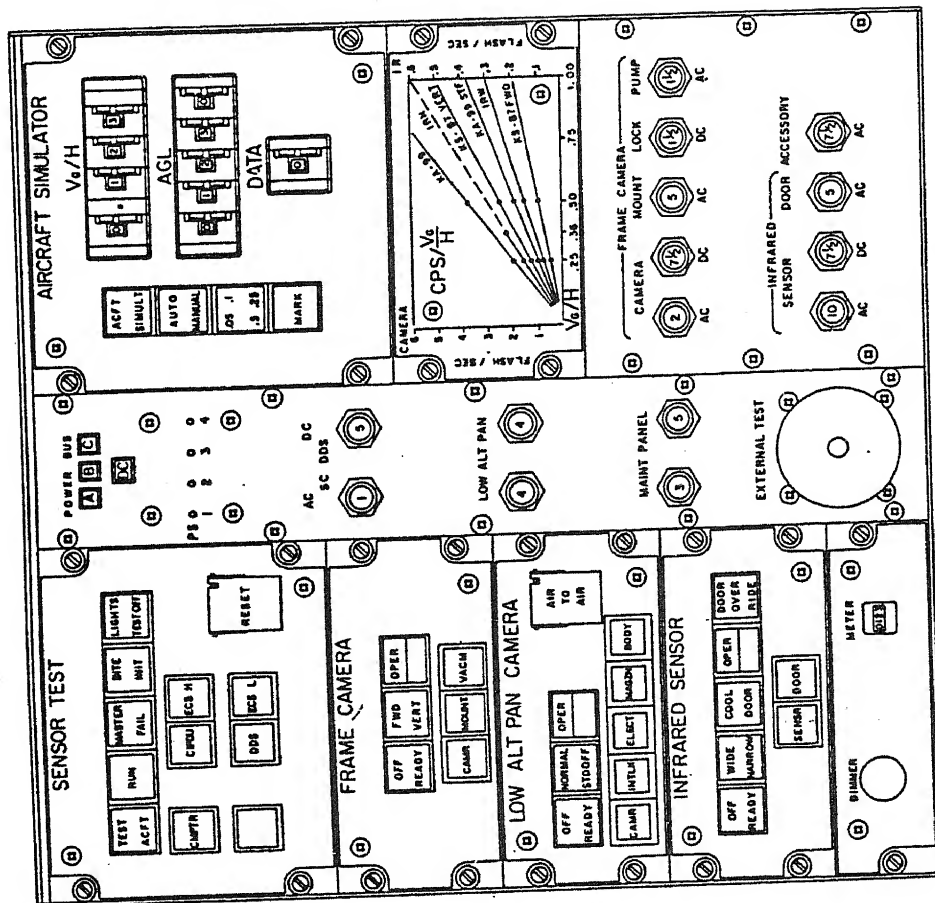


NOTE: RECEIVER AND MAINTENANCE
PLATE INVERTED FOR CLARITY

IR RECEIVER MAINTENANCE PLATE ASSEMBLY



FMC FILM DRIVE SERVO LOOP BLOCK DIAGRAM



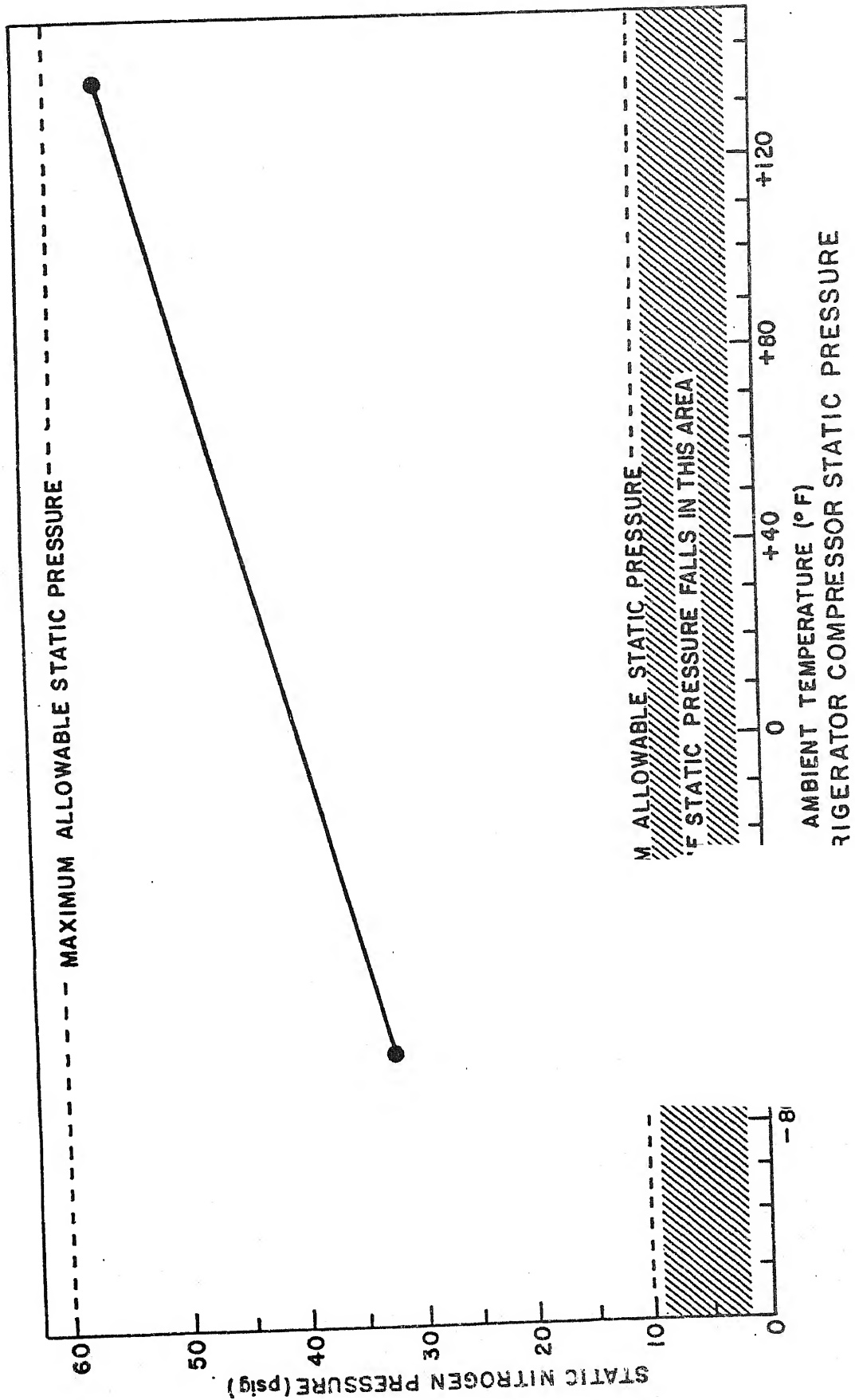
CPS, IRPA, AND CIPDU FAIL INDICATORS

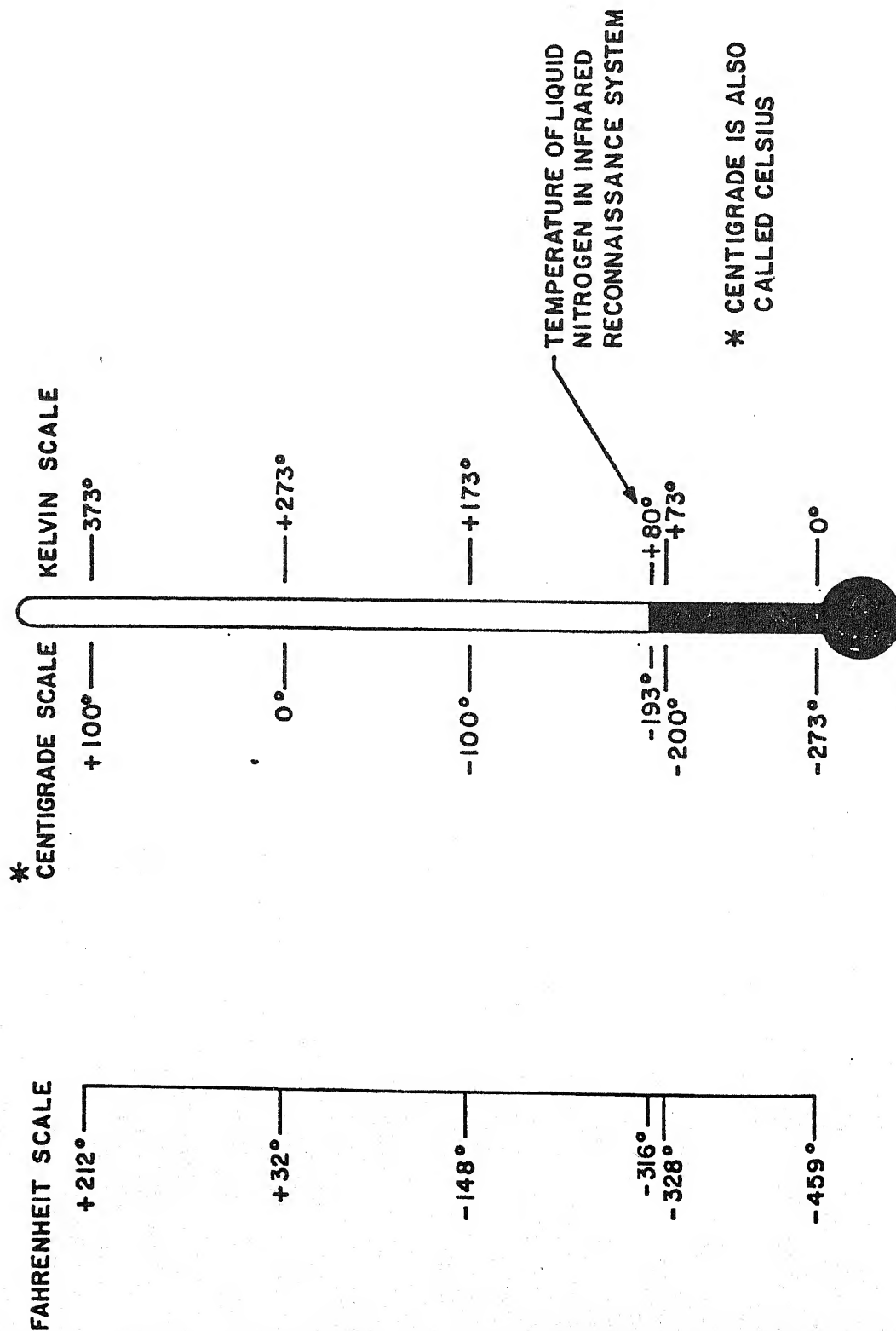
IRRS STATUS	STATUS INDICATOR	CPS		IRPA						CIPDU		
		IRNR	IRLS FAIL	PMRS	RCVR	RCDR	FMAG	COOL	IRPA	(SYSTEM) FAIL	SENSR	MASTER FAIL
1.	Initial 32-second system stabilization period after power ON	ON	OFF	W	W	W	W	W	W	W	G	OFF
2.	Continuous Monitor Mode (active after 32-second stabilizing period) a. Cooldown incomplete (less than 17.6 minutes after power ON with no IRRS failures) b. Cooldown not achieved within 17.6 minutes after power ON c. STANDBY, READY, OPERATE/RUN: (1) +6V, +15V, +300V, +28V DC FAIL (2) CRT High Voltage (18KV) FAIL d. READY, OPERATE/RUN: (1) +70/+45 Spin Motor Voltage FAIL e. OPERATE/RUN: (1) Phosphor protect (CRT Sweep) FAIL (2) Film Magazine Operation FAIL (Phase Lock) (3) Autofocus FAIL	ON	OFF	W	W	W	W	W	W	W	G	OFF
		ON	OH	W	W	W	W	R	W	R	R	ON
		OFF	OH	W	W	W	W	W	W	R	R	ON
		OFF	OH	R	W	W	W	W	W	R	R	ON
		OFF	OH	W	W	R	W	W	W	R	R	ON
		OFF	ON	W	W	W	R	W	W	R	R	OH
3.	Operational Readiness Mode(BIT) <div>Active for 80 seconds; occurs approximately 25 seconds after cooldown. IR Selector Switch not in OPERATE/RUN position. CMM is in GO status. ORM is active ORM fails (except for DDM condition)</div>	OH	OFF	W	W	W	W	W	W	W	G	OFF
		ON	OH	W	W	W	W	W	W	W	R	ON
4.	Degraded Operation(DDM) (detectable only during ORM) a. Coldspring equalization FAIL, Channels 1-5, 7-12 b. Video output FAIL, Channels 1-5, 7-12	OFF	OFF	W	**	**	W	W	W	W	G	OFF
		OFF	OFF	W	**	**	W	W	W	W	G	OFF

G = Green (GO)
R = Red (FAIL)
MASTER FAIL (OH) = Red (FAIL)

W = White (GO)
R = Red (FAIL)
* Applicable IRR
** Receiver, Recorder or Both

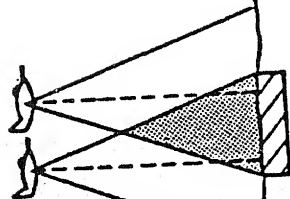
IRNR (ON) = Amber
IRLS FAIL (OH) = Amber



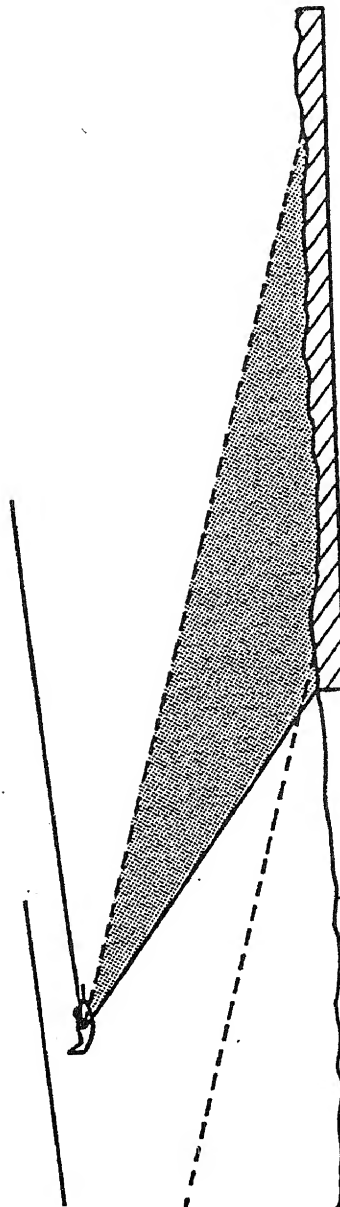


COMPARISON OF KELVIN, CENTIGRADE, FAHRENHEIT SCALES

- CONDITIONS:
- 6 INCH CAMERA LENS
 - AIRCRAFT AT SAME ALTITUDE
 - GROUND SPEED IS SAME
 - INTERVAL BETWEEN 1st AND 2nd PICTURE ESTABLISH TO OBTAIN 55% OVERLAP

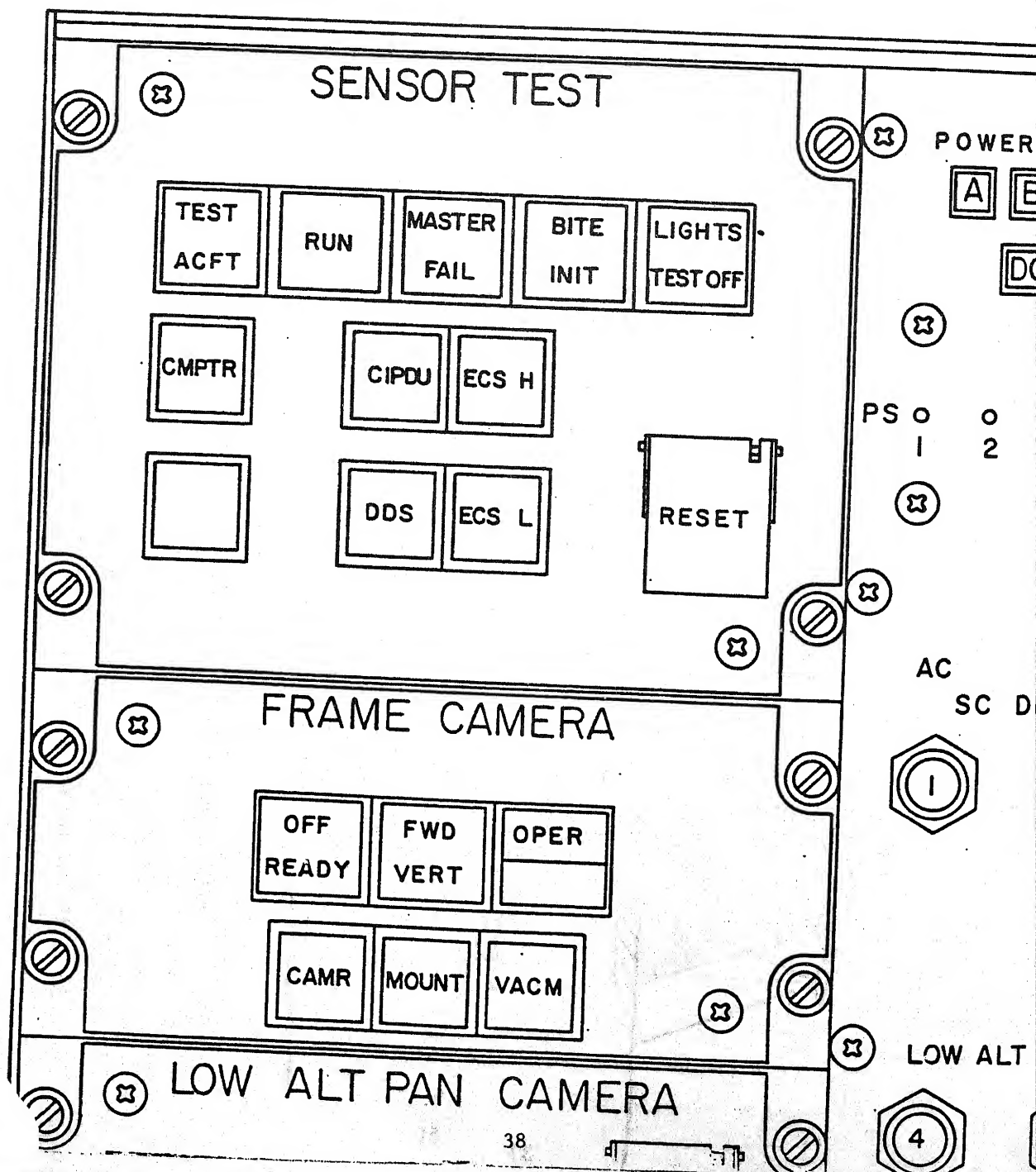


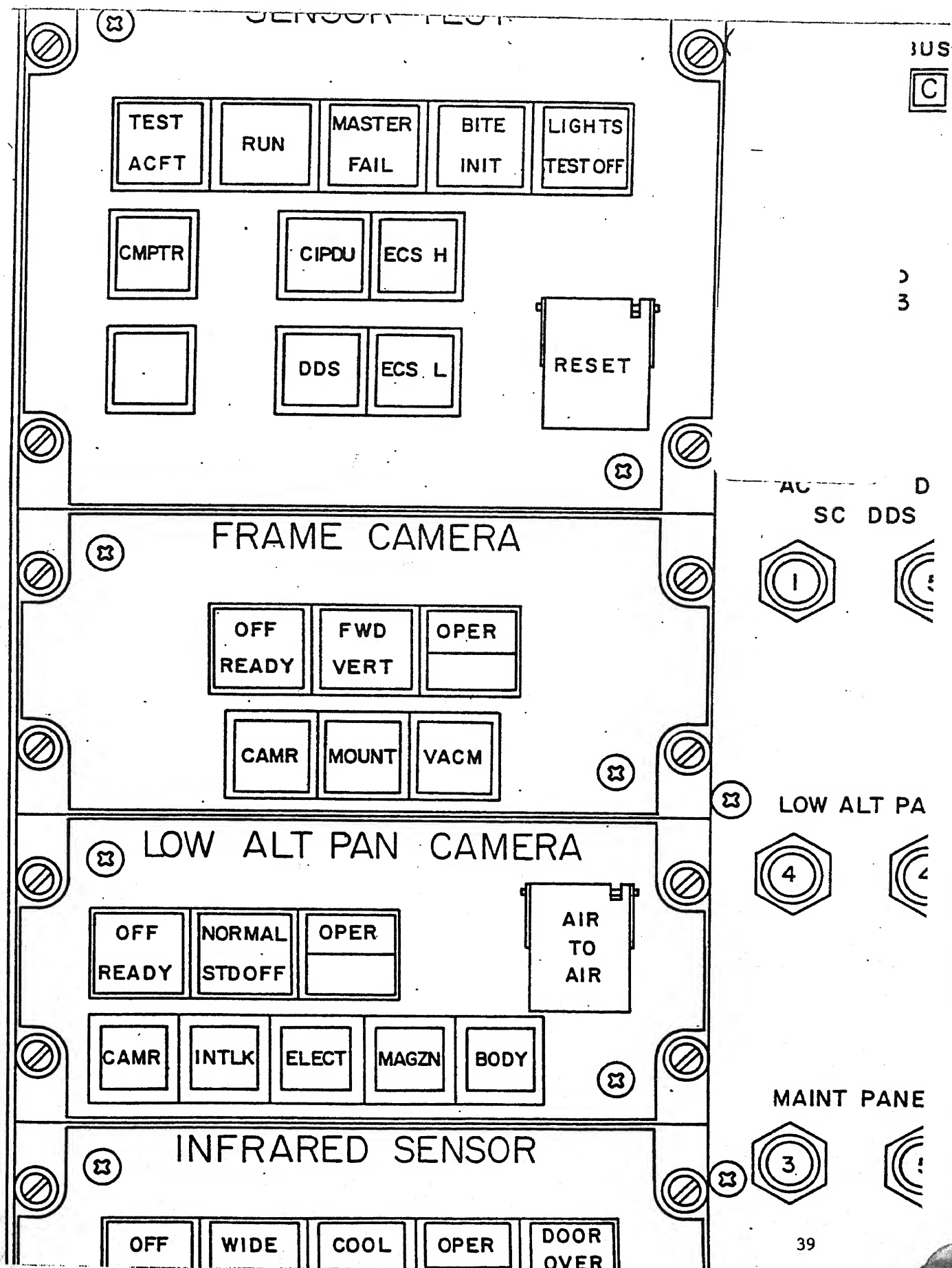
VERTICAL PHOTOGRAPHY

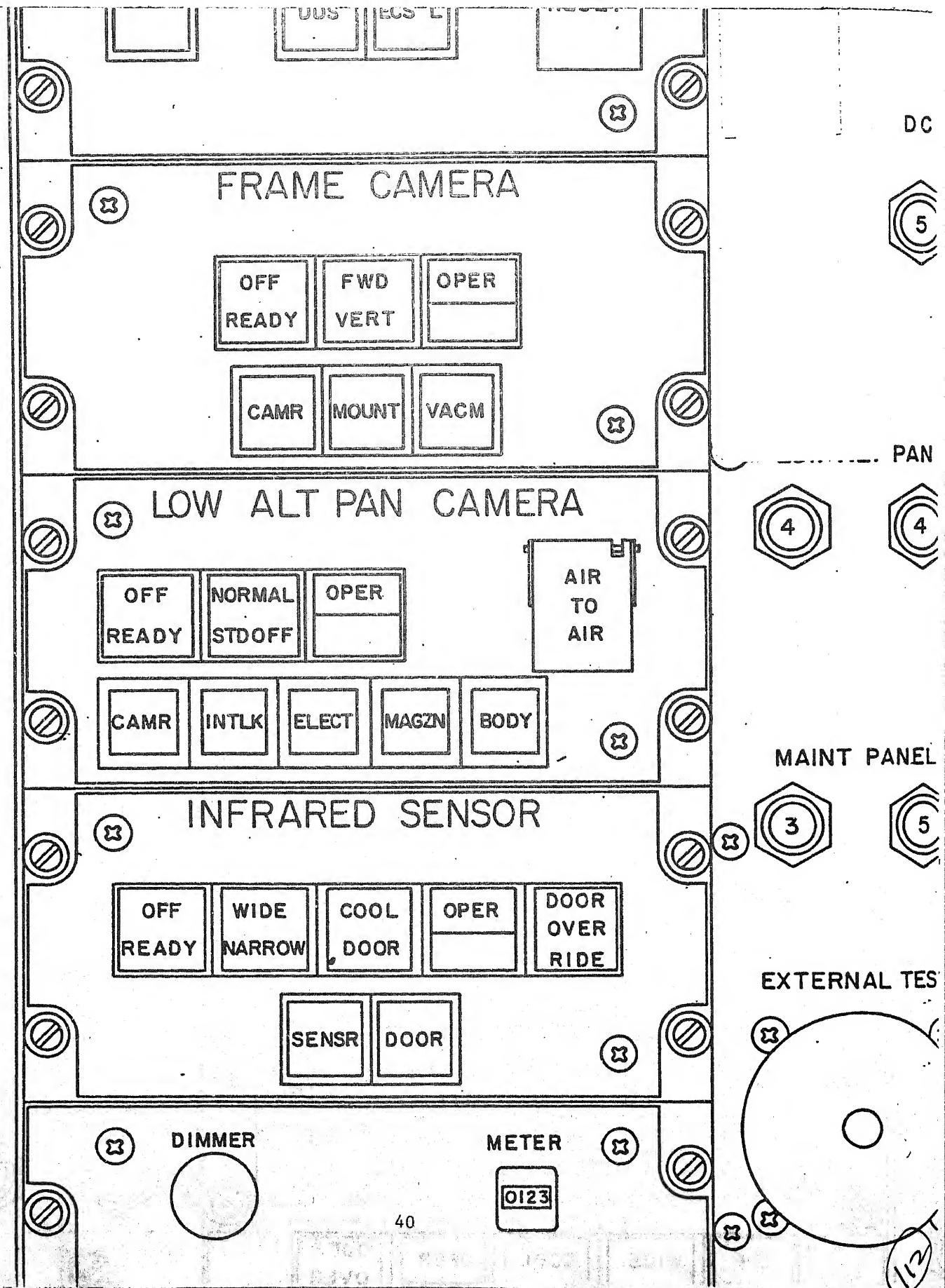


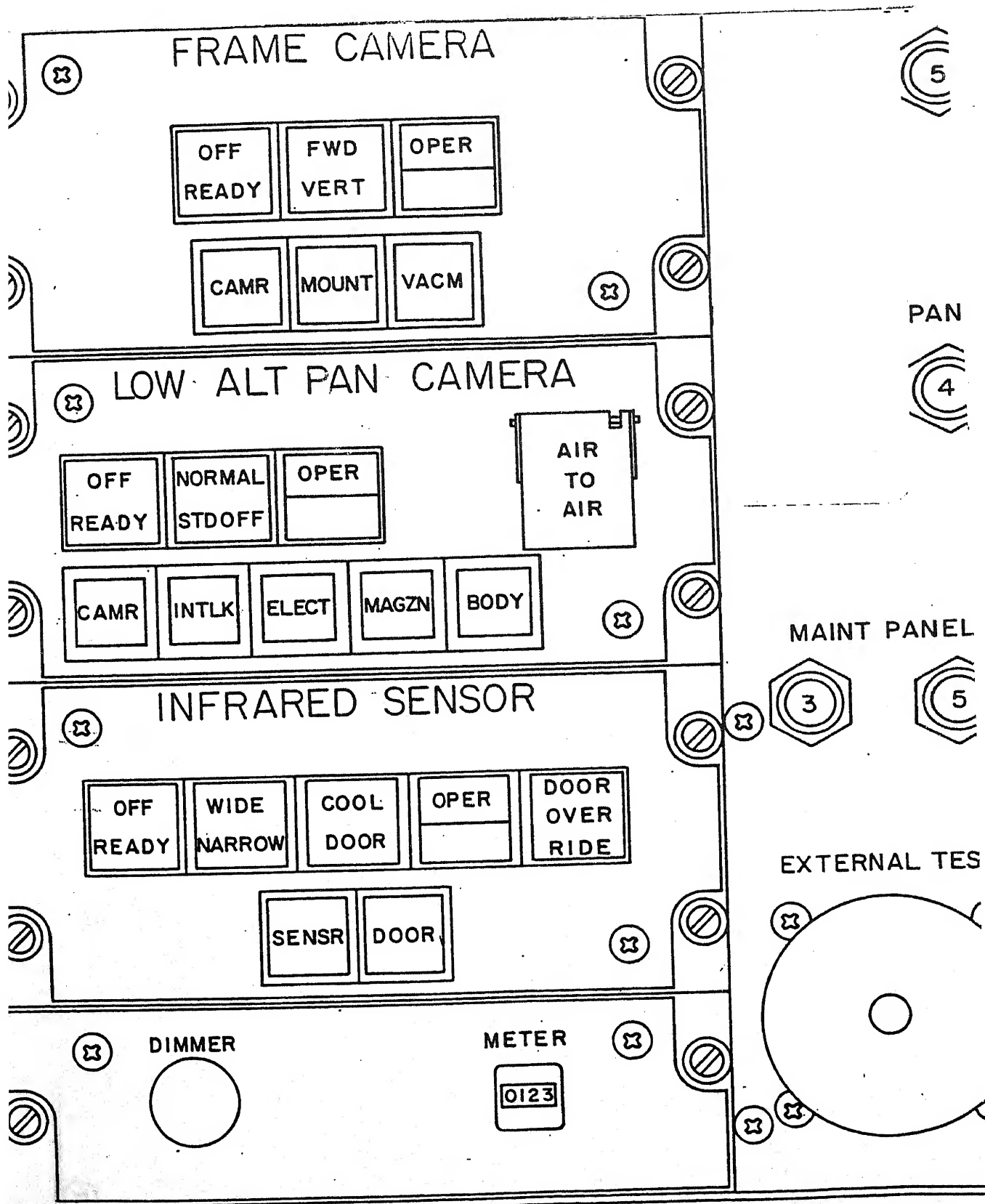
OBlique PHOTOGRAPHY (CAMERA AXIS 15° BELOW HORIZON)

FOR COMPARISON BETWEEN VERTICAL AND FORWARD PHOTOGRAPHY









POWER BUS

A B C

DC

3

0 0 0 0
1 2 3 4

3

AC DC
SC DDS



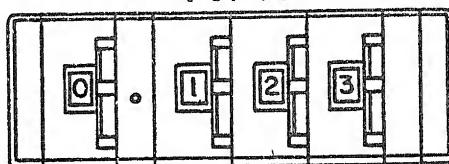
LOW ALT PAN



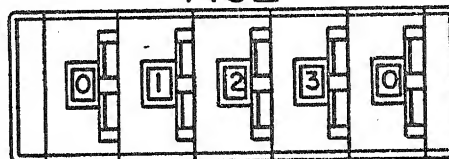
MAINT PANEL

AIRCRAFT SIMULATOR

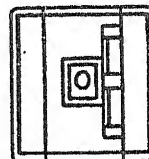
V_G/H



AGL



DATA



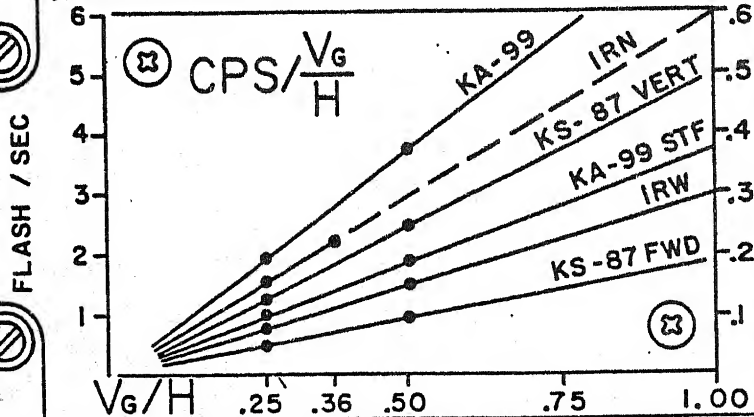
ACFT
SIMULT

AUTO
MANUAL

.05 .1
.5 .25

MARK

CAMERA



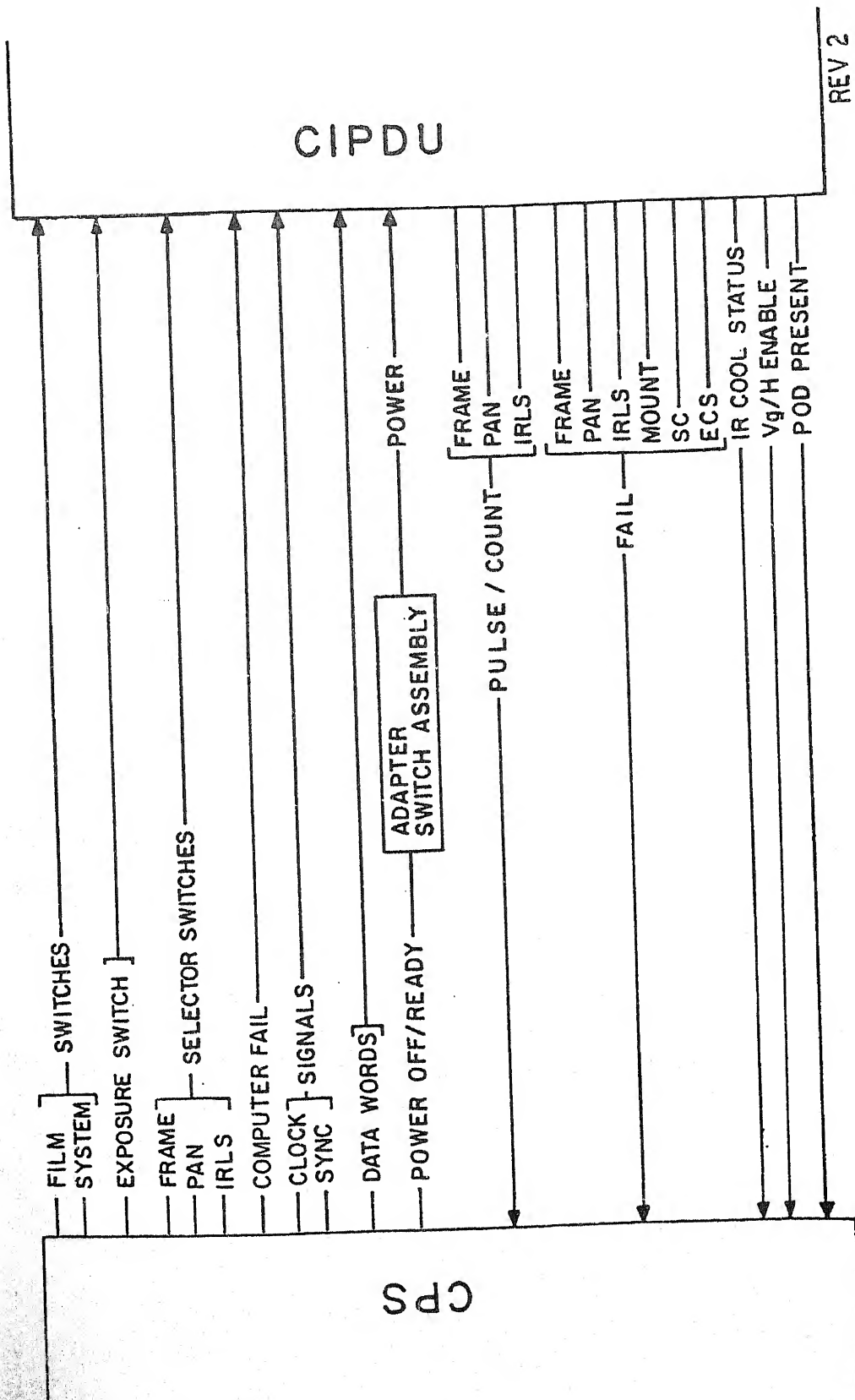
FRAME CAMERA

CAMERA

MOUNT

LOCK

PUMP



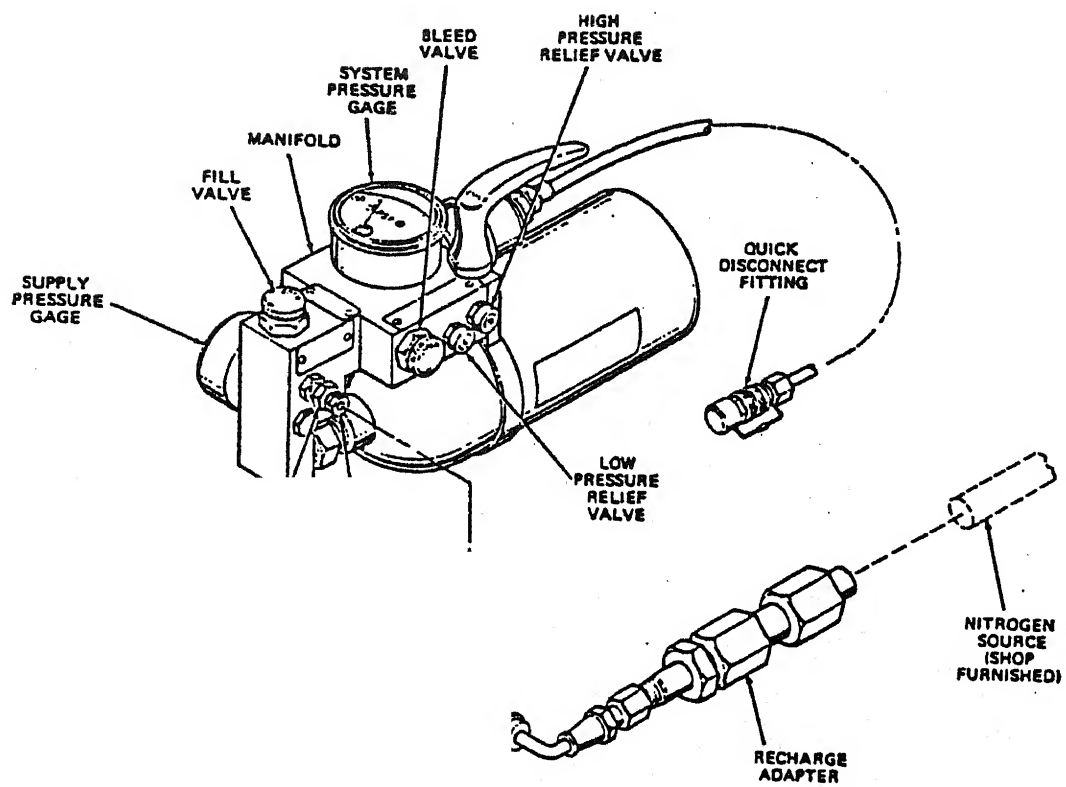
CPS - CIPDU - POD INTERFACE

	Vg/H (Knots/foot)		Camera Cycling Rate (CPS)
	Decreasing	Increasing	
NORMAL MODE	Switches to pulse 0.047	-	0.36
	Switches to autocycle -	0.053	0.40
	FMC Out 0.030	-	0.23
	FMC In -	0.036	0.27
STAND-OFF MODE	Switches to pulse 0.094	-	0.36
	Switches to autocycle -	0.106	0.40
	FMC Out 0.026	-	0.10
	FMC In -	0.032	0.12

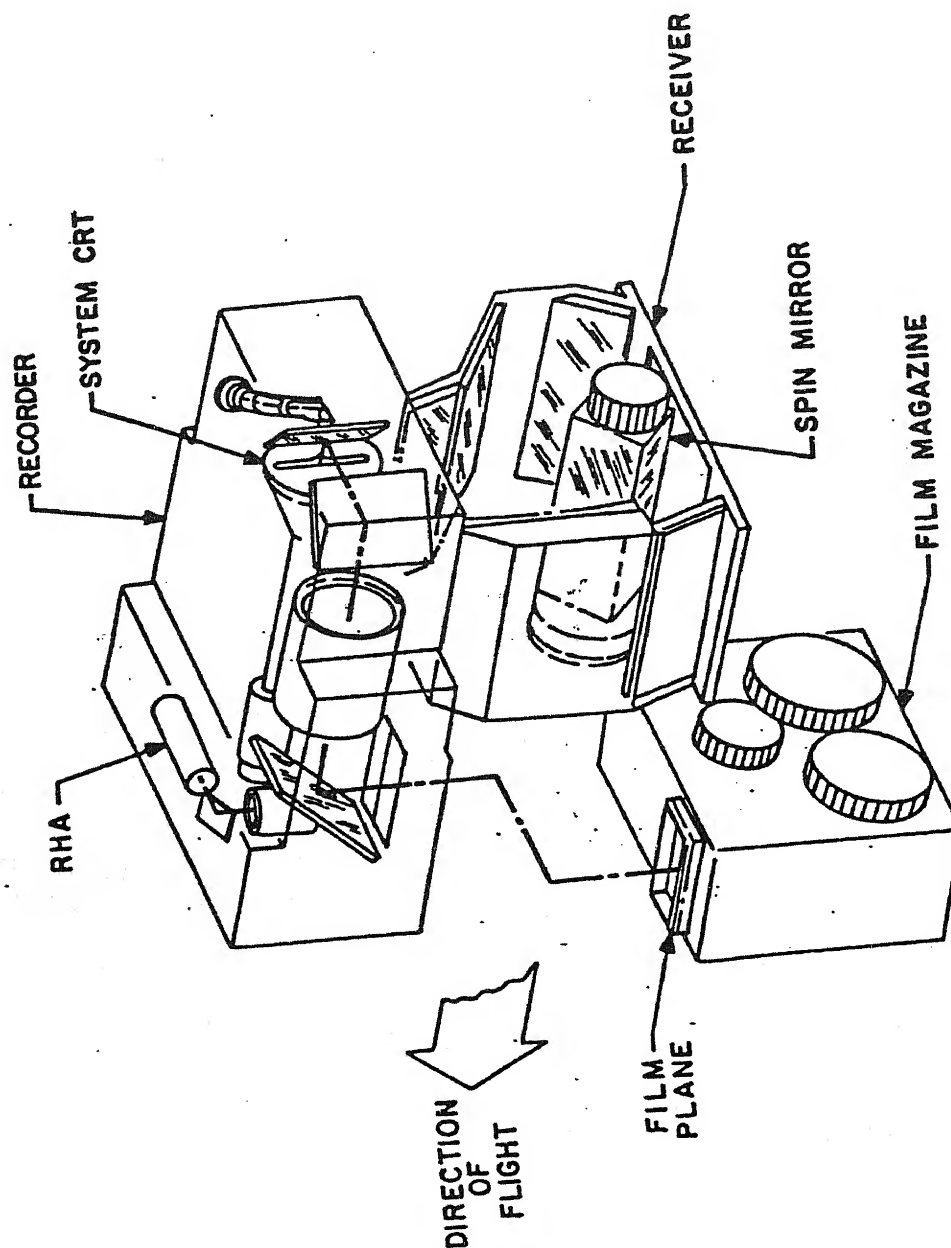
KA-99A Vg/H SWITCH POINTS

INPUTS TO AN/AAD-5 RECORDER

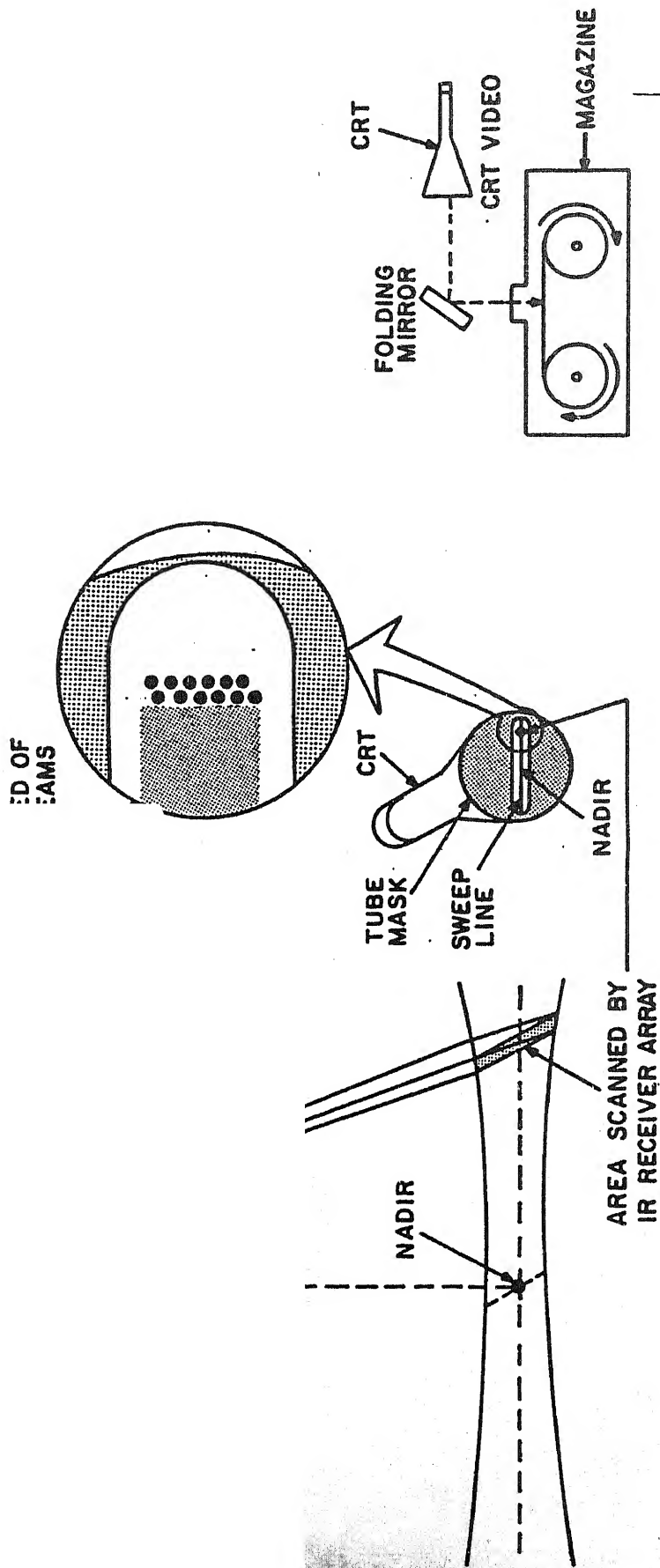
- VIDEO SIGNALS (REPRESENTING SCANNED AREAS)
- TIMING PULSES
- AIRCRAFT ROLL CORRECTION DATA (FROM IMU)



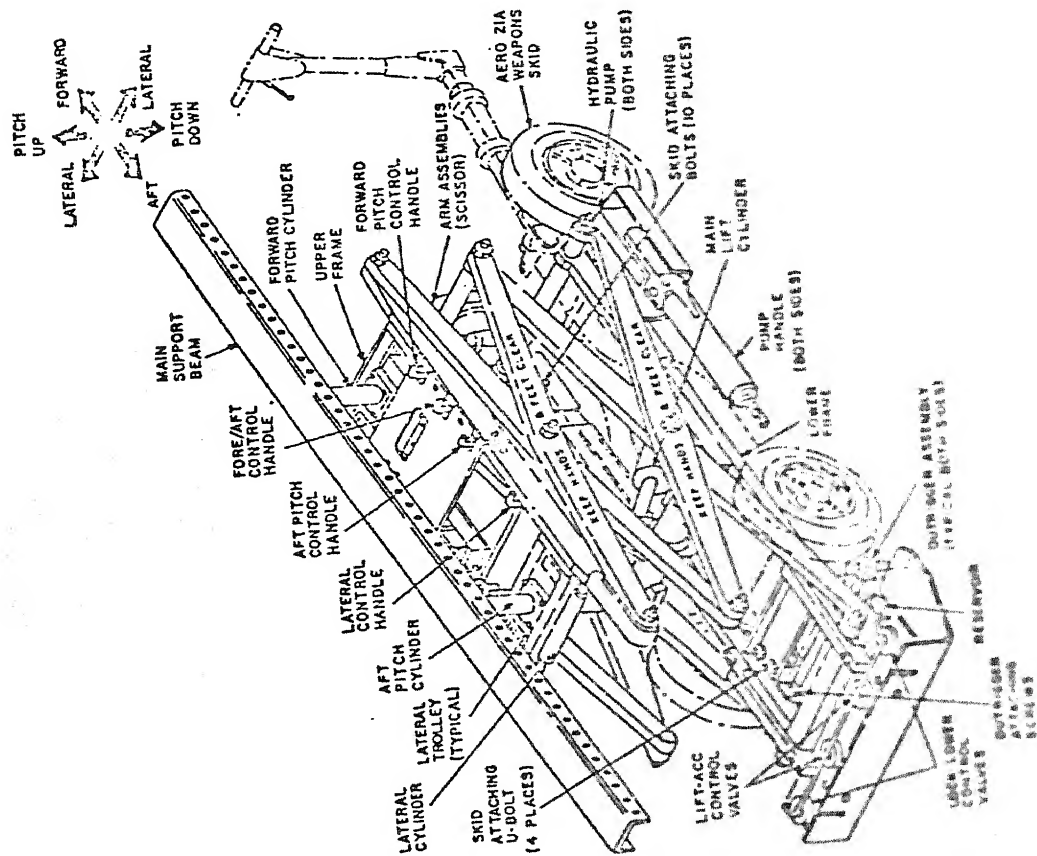
SERVICING UNIT



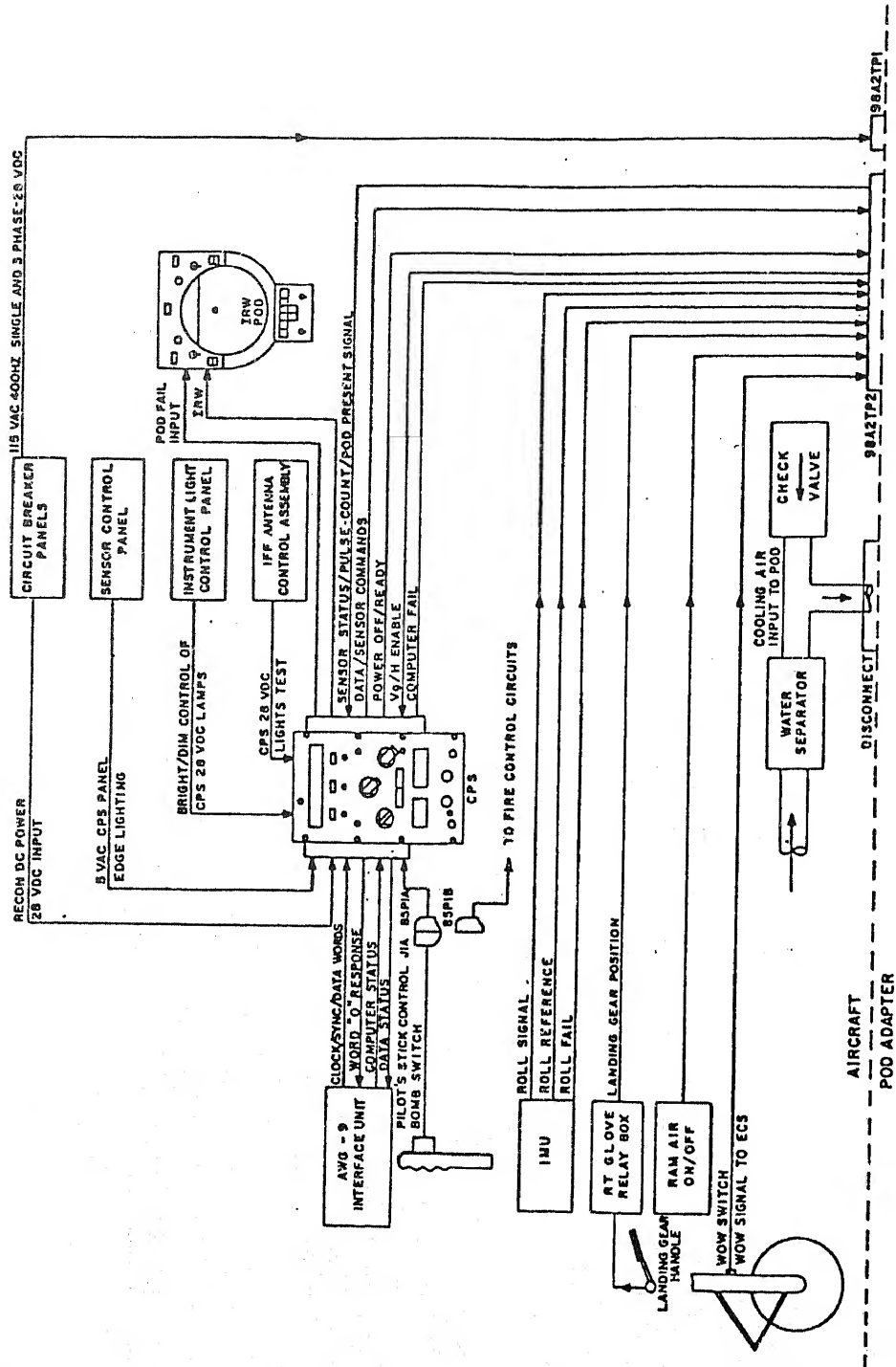
AN/AAD-5 OPTICAL SYSTEM



IR SYSTEM OPERATION

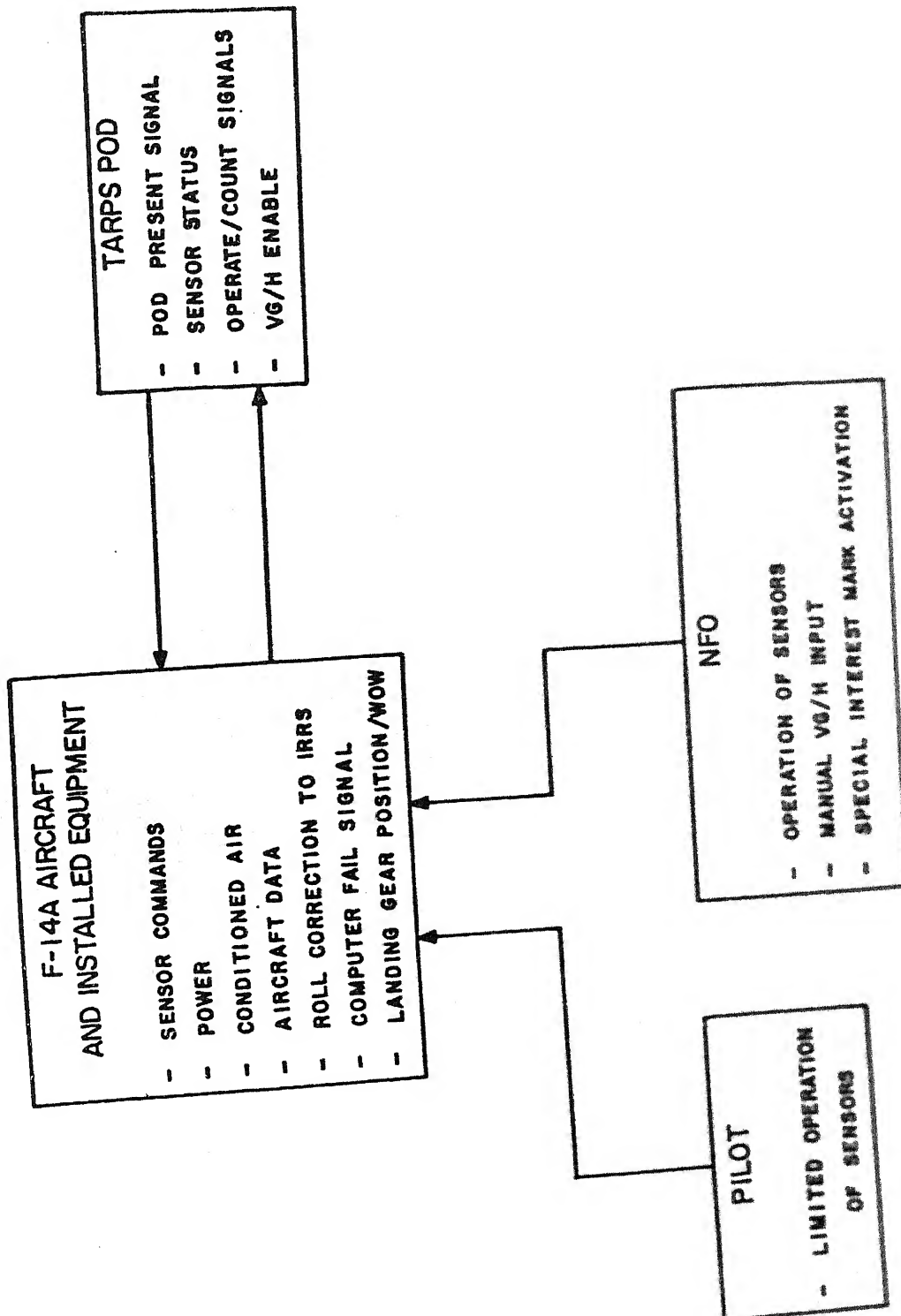


LIFT LOADS ARE APPLIED TO THE LIFT LOADS CONTROLS AND PUMP

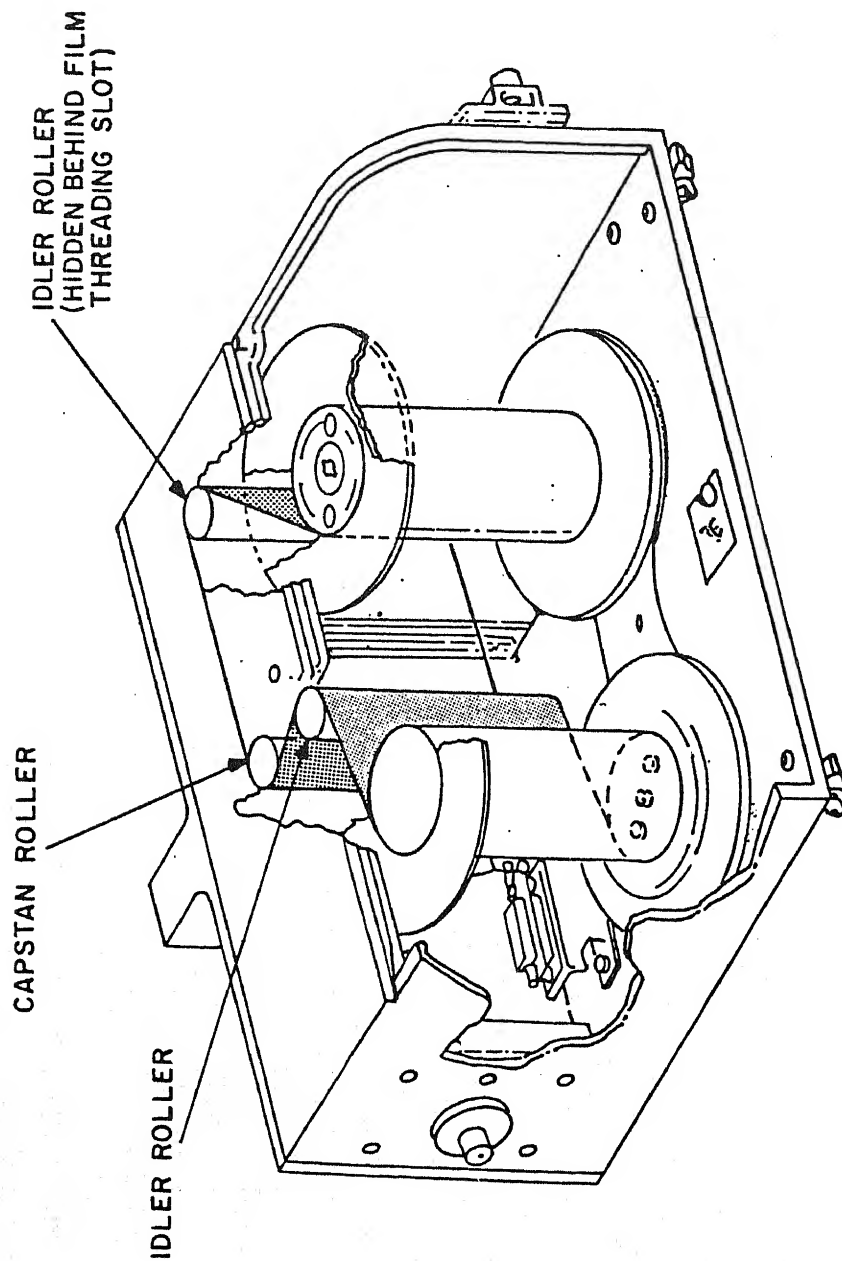


F-14A AIRCRAFT/POD INTERFACE

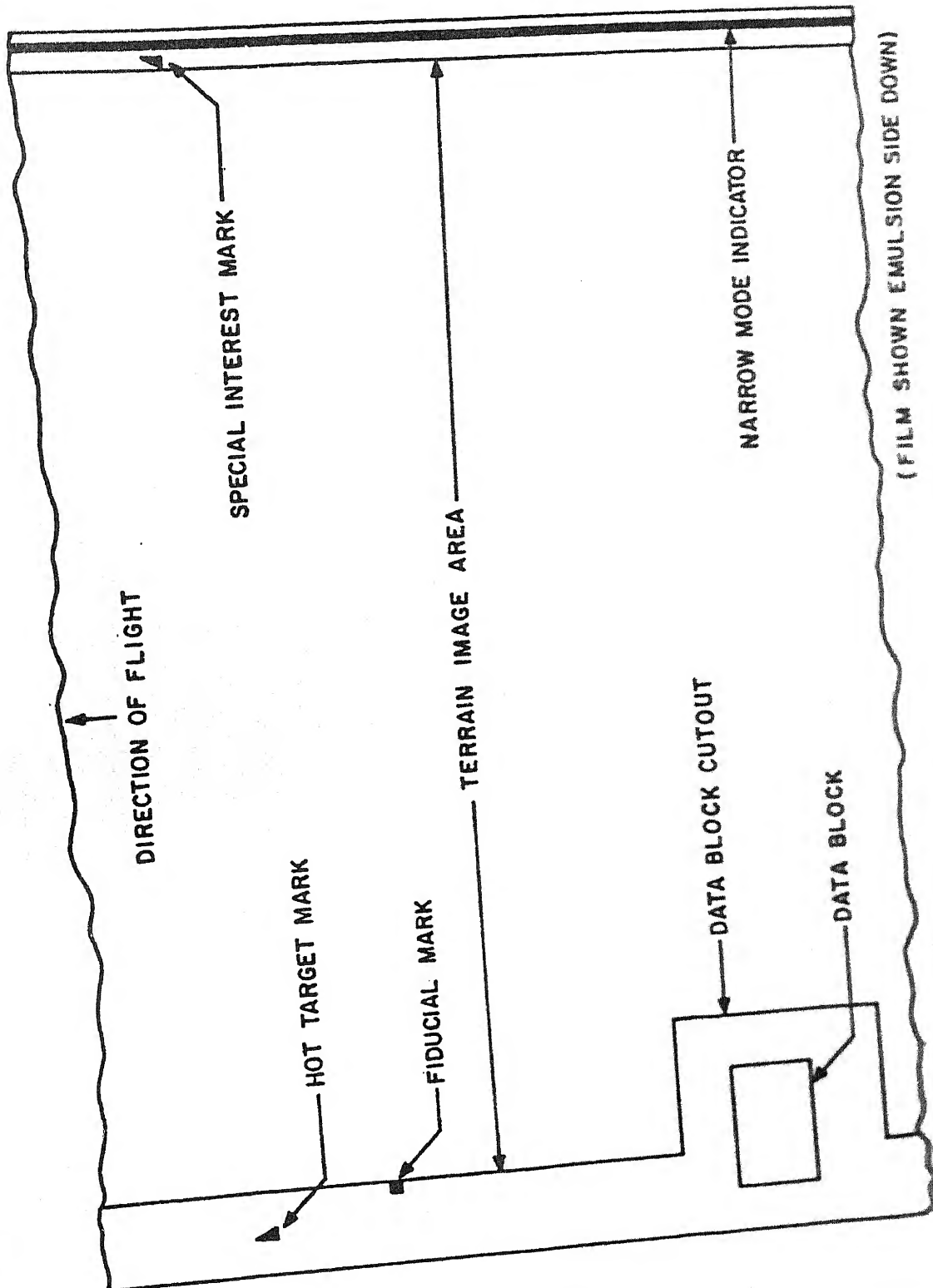
REV 4/81



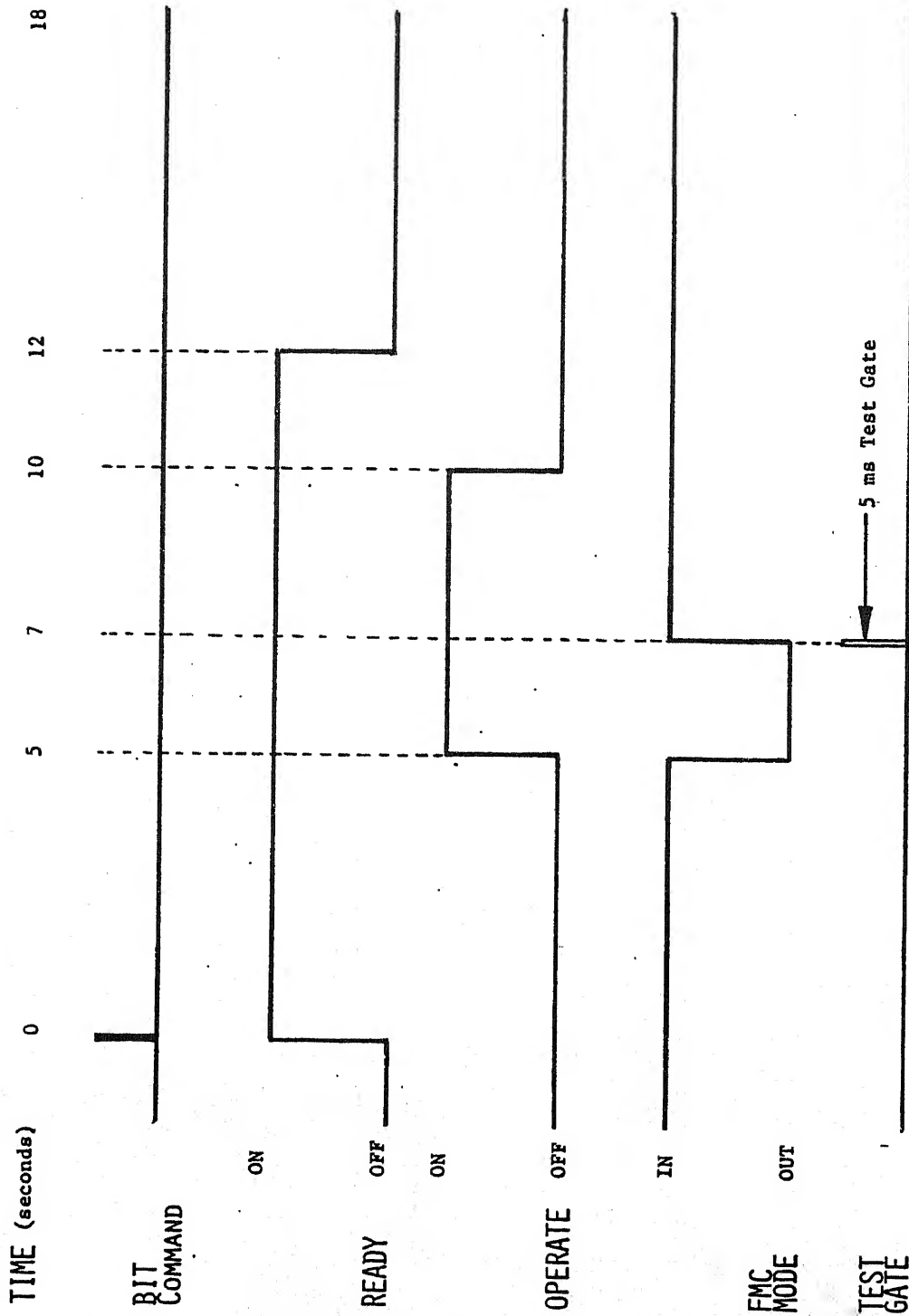
F-14A/TARPS POD FUNCTIONAL RELATIONSHIP



FILM THREADING PATH AN/AAD-5 FILM MAGAZINE



AN/AAD-5 FILM FORMAT AND ANNOTATION ARRANGEMENT



KA-99A BIT TIMING DIAGRAM

MIDDC SENSOR CHECKOUT MATRIX

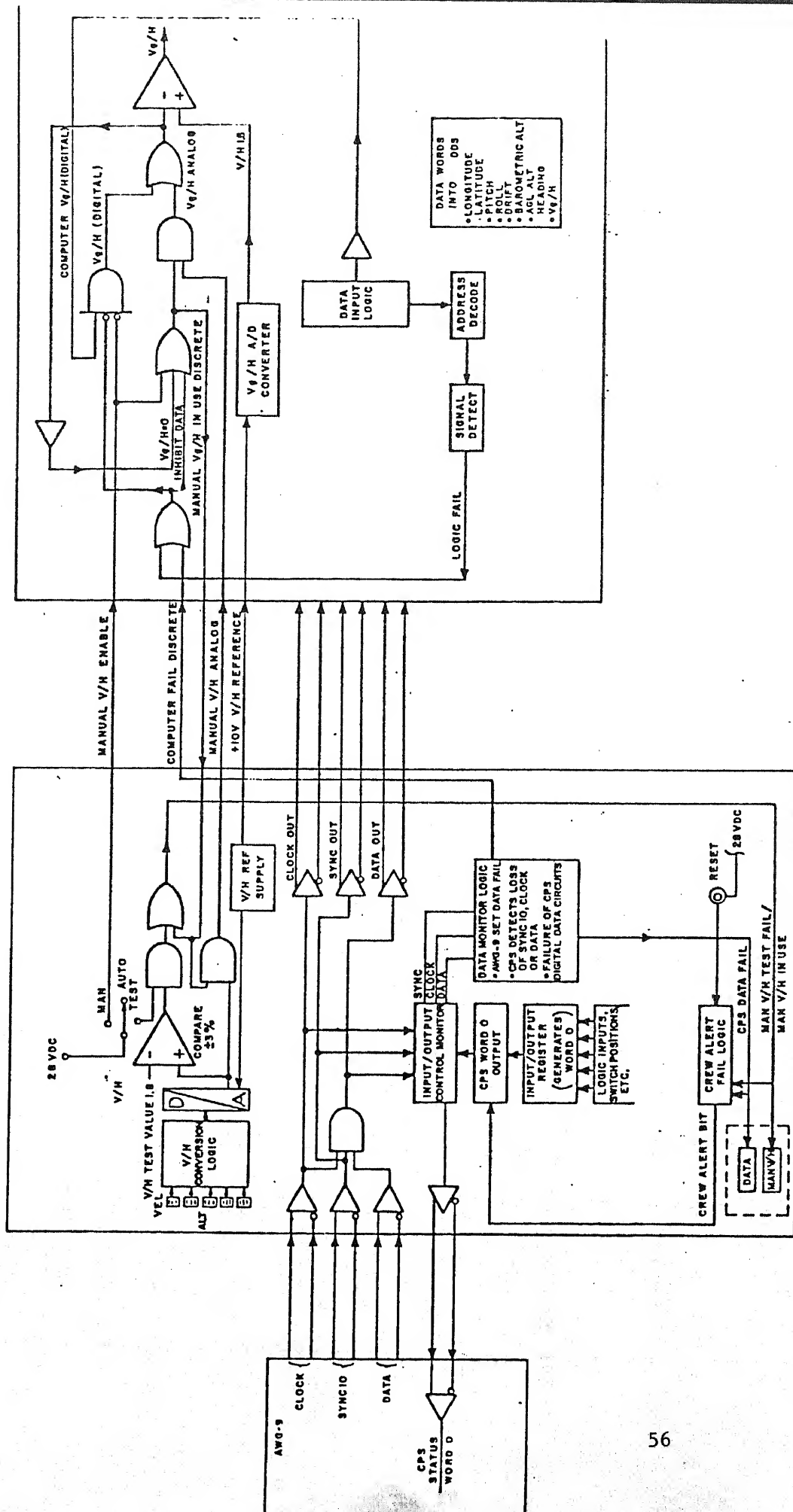
SENSOR	MODE	Vg/H	M/A*	CYCLE RATE**
KS-87B	VERT	.1	M	.50
	VERT	.25	A	1.25
	VERT	.5	M	2.50
	VERT	.75	A	3.75
KS-87B	FWD	.1	M	0.180
	FWD	.25	A	0.450
	FWD	.5	M	0.900
	FWD	.75	A	1.350
KA-99A	NORM	.05 (Pulse)	M	0.377
	NORM	.25	A	1.866
	NORM	.5	M	3.773
	NORM	.75	A	5.660
KA-99A	STANDOFF (L)	.1 (Pulse)	M	.377
	STANDOFF (L)	.25 (Pulse)	A	.943
	STANDOFF (R)	.5	M	1.886
	STANDOFF (R)	.75	A	2.830
AN/AAD-5	WFOV	.5	M	1.829
	WFOV	1.0	A	3.659
	NFOV	.1	M	0.658
	NFOV	.25	A	1.829
	NFOV***	.36	A	2.600
				ft/sec

*M = MANUAL

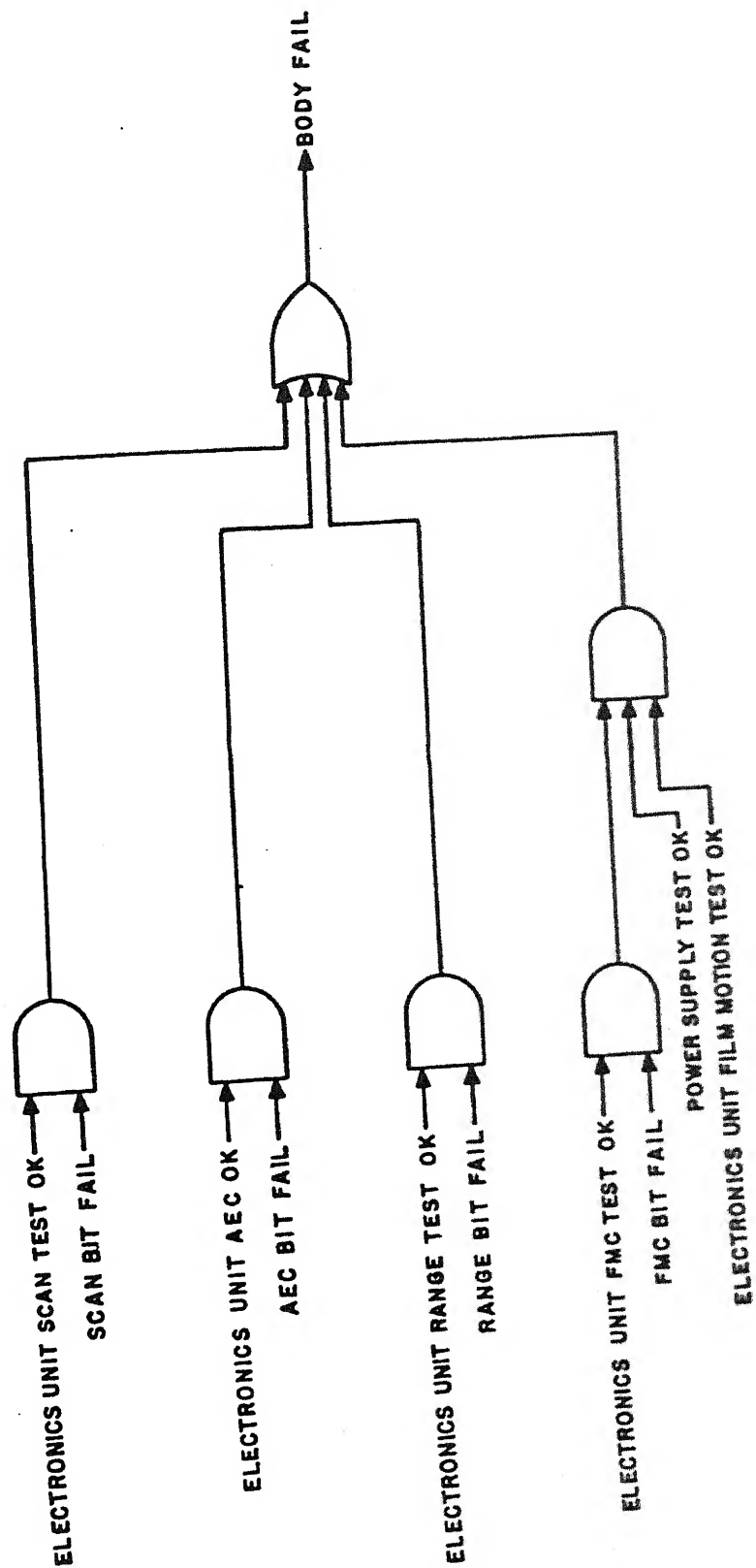
*A = AUTO

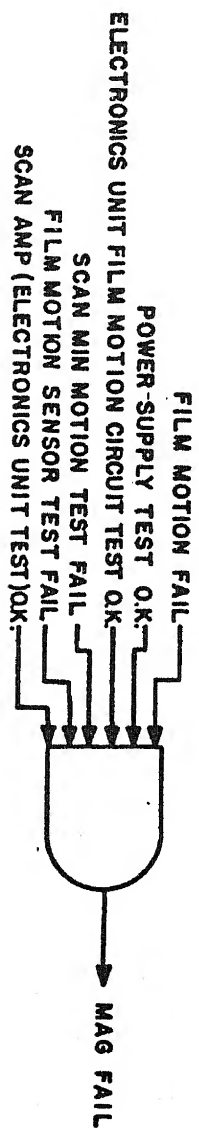
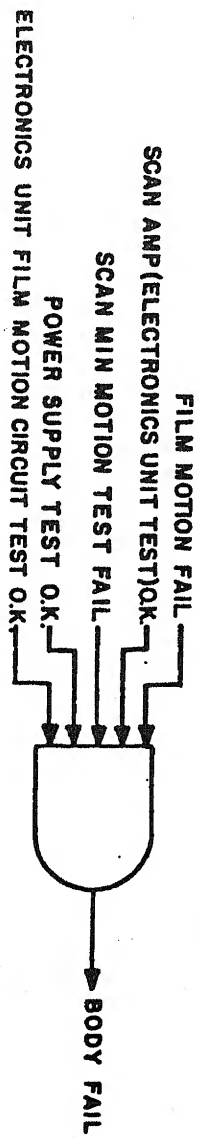
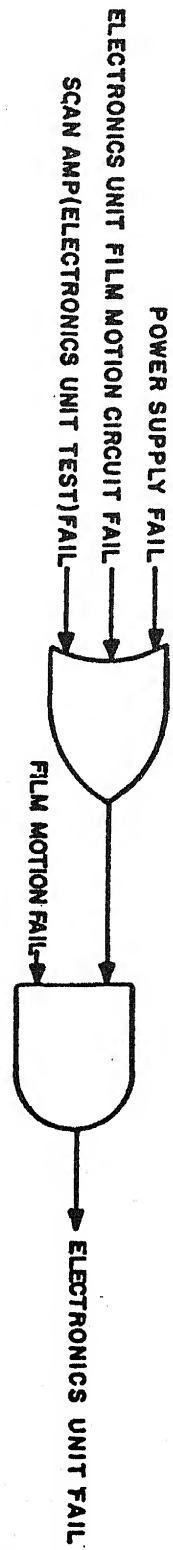
**RATE = CYCLES/SEC. FOR AN/AAD-5=IN/SEC and FT/SEC

***MAX RATE FOR NFOV MODE

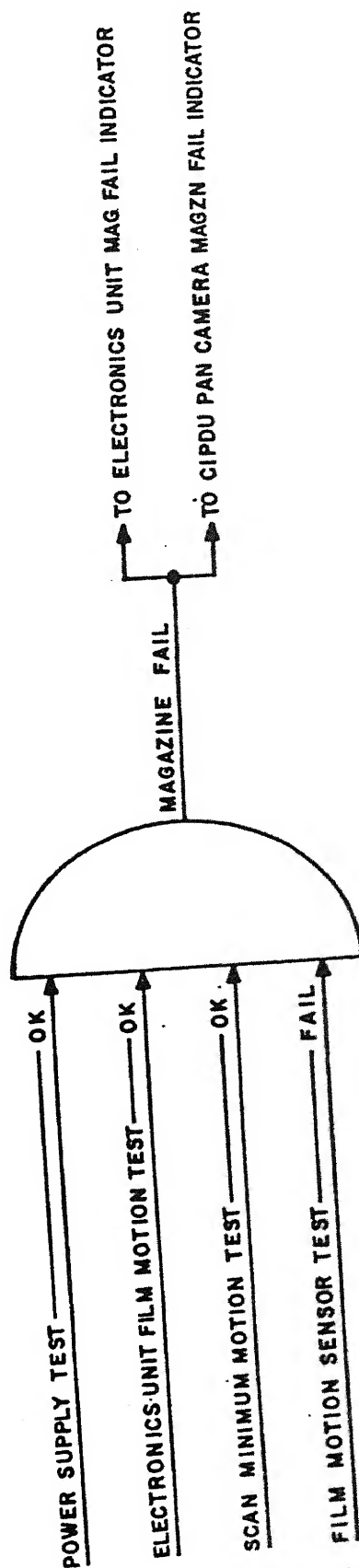


Vg/H SELECTION CIRCUIT-SIMPLIFIED LOGIC DIAGRAM





FILM MOTION BIT FAIL



MAGAZINE BIT TEST FAIL

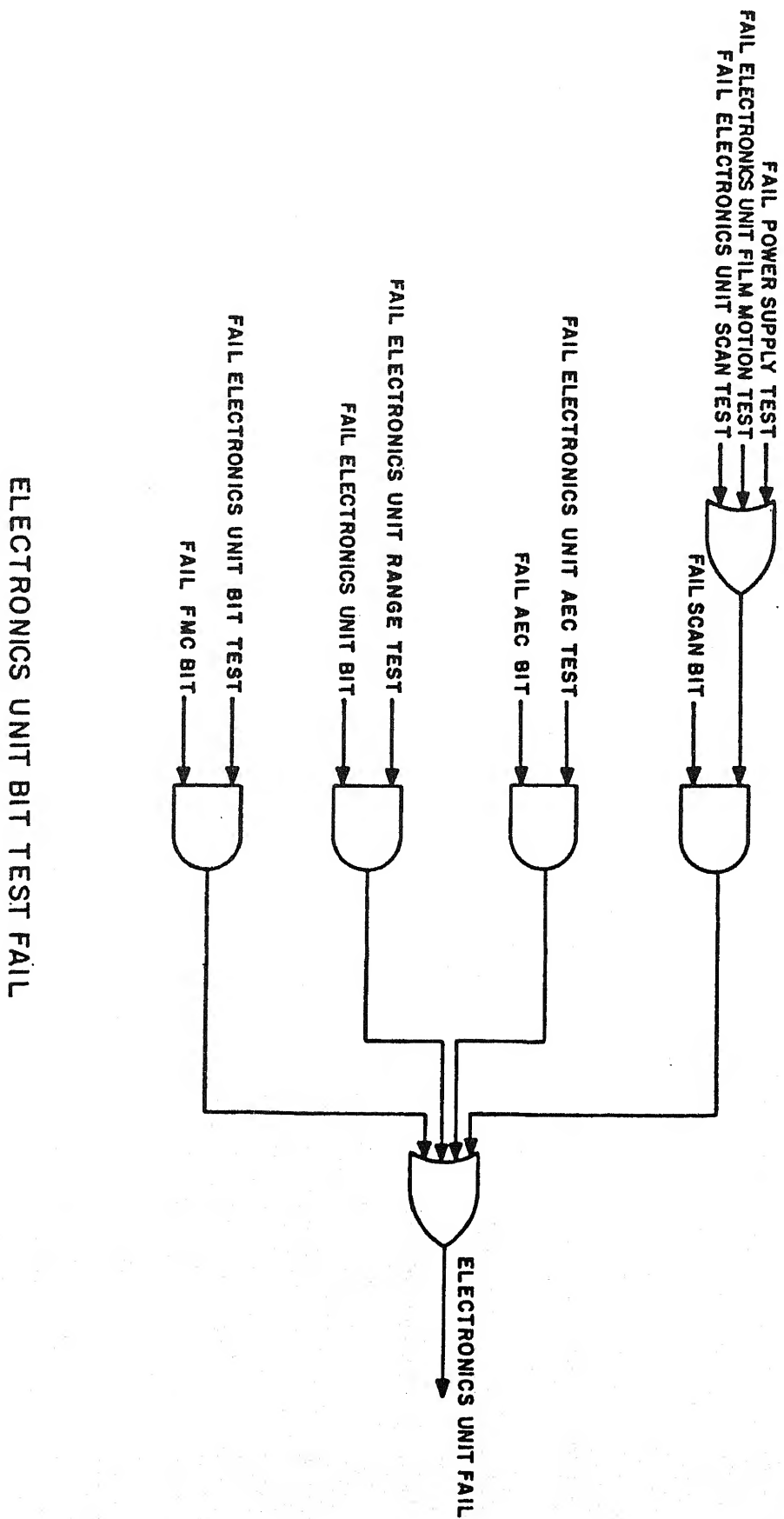


Table 3-8. IRPA ORM Sequences Chart

PROGRAM STEP (DECIMAL)	PROGRAM STEP (OCTAL)	INITIAL DURATION	ORM DURATION	ORM TOTAL TIME	IRPA FUNCTION	COUNTER PRESET	SELECTED COUNT RATE	SELECTED APERTURE	SYSTEM CONTROL	FOV SELECTION	V/H SELECTION	VIDEO TEST ENABLE	ALLOWABLE RANGE	ALLOWABLE TOLERANCE (%)	LRU
0	0	32s	488 μ s	488 μ s	Power on IRRS stabilization and IRPA self test	0	0	128 Hz	MSB	CP	NAV	0	N/A	N/A	IRPA
1	1	1,024s	488 μ s	970 μ s	Cooldown allowances (17.0 min)	0	0	4 Hz	MSB	CP	NAV	0	N/A	N/A	COOL
2	2		250 ms	250 ms	ECS circuits self test	0	0	400 Hz	4 Hz	CP	NAV	0	1.5	4.5	IRPA
3	3		250 ms	500 ms	Video circuits self test	0	0	400 Hz	4 Hz	CP	NAV	0	0.25	—	IRPA
4	4		24s	24.5s	Scanner speed stabilization (NFOV)	1024	2000	125 Hz	MSB	N			N/A	N/A	—
5	5		4s	28.5s	Sync pulse min prf (196 Hz)	3704	7170	TP 21	0.25 Hz	N		1	—	203.5	RCVR
6	6		4s	32.5s	Sync pulse max prf (203.5 Hz)	3688	7160	TP 21	0.25 Hz	N	9V		1.5	4.5	RCVR/RCDR
7	7		2s	34.5s	ECS channels (NFOV)	0	0	N/A	0.50 Hz	N			N/A	N/A	—
10	8		16s	50.5s	Scanner speed stabilization (WFOV)	0	0	256 Hz	MSB	W	9V		392	—	RCVR
11	9		4s	54.5s	Sync pulse min prf (392 Hz)	3312	6360	TP 21	0.25 Hz	W	9V		—	407	RCVR
12	10		4s	58.5s	Sync pulse max prf (407 Hz)	3280	6320	TP 21	0.25 Hz	W	9V		1.5	4.5	RCVR/RCDR
13	11	N/A	2s	60.5s	ECS channels (WFOV)	0	0	N/A	0.50 Hz	W	9V		0.25	—	RCDR
14	12		2s	62.5s	Video channels (all channels on)	0	0	N/A	0.50 Hz	W	9V		16.22	—	RCDR
15	13		250ms	62.75s	Film trans. rf (16.22 kHz)	2064	4020	TP 56	4 Hz	W	9V		—	16.89	RCDR
16	14		250 ms	63.0s	Film trans. rf (16.89 kHz)	1976	3670	TP 56	4 Hz	W	9V		N/A	N/A	—
17	15		2s	65.0s	V/H stabilization	0	0	N/A	0.50 Hz	W			0.25	—	RCDR
20	16		2s	67.0s	Video channels (6 on, others off)	0	0	N/A	0.50 Hz	W			297	—	RCDR
21	17		4s	71.0s	Film trans. rf (min)	3504	6660	TP 56	0.25 Hz	W			—	309	RCDR
22	18		4s	75.0s	Film trans. rf (max)	3476	6624	TP 56	0.25 Hz	W			—	—	FMAG/RCDR
23	19		5s	80.0s	Operate mode*, autofocus*, phase lock*, FMRFQ*, and phosphor protect*	1536	3000	512 Hz	MSB	W			—	—	—
24	20		0.5 ms	80.0s	End of sequence	0	0	N/A		CP	NAV	0	N/A	N/A	—

NOTES: All CMM functions are active during ORM sequence.
 *Same tests performed when operate mode is selected manually.

NAV = Navigation computer
 1 = IRPA
 CP = Control Panel (CP8 or C1PDU)
 MSB = Most Significant Bit
 ECS = Equalized Cold Spike
 QEP = Quadrant Encoder Pulse



